CSUDH

California State University Dominguez Hills

Guidelines for 2018 Master Plan

Appendix

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Appendix A: Landscape Palettes

The Landscape Guidelines Palettes will provide recommendations for newly landscaped areas and replacement plant materials consistent with campus standards and the campus aesthetic.

Appendix B: Technical Reports

Parallel to the Master Plan process, the campus infrastructure was evaluated by the subconsultants who were apart of the Master Plan team. Their reports are produced here in their original forms.

Appendix C: University Village Design Guidelines

The **University Village** is an urban design concept within the CSUDH 2018 Master Plan.

Unless otherwise noted, the analyses and reports produced for this Appendix include all the parcels of the University Village.

Appendix A: Landscape Palettes

The **University Village** is an urban design concept within the CSUDH 2018 Master Plan that integrates the academic core and the student residential community with a neighborhood of retail and business communities and campus apartment housing to create a live/work/play environment with synergistic connections to the University's mission and purpose. Unless otherwise noted, the Design Guidelines analyses and reports appearing in this Appendix address all the parcels of the University Village.

Trees	Habitat		Form						Zone					Characteristic					Cultural Needs			
	Bird	Pollinator	Tall Upright	Tall Broad	Large Spreading	Small Upright	Small Spreading	Palm	Campus Edge	California	Australia	Mediterranean	S. Africa/Chile	Deciduous	Evergreen	Flower Color	California Native	Drought Tolerant	Special Watering	Protect from Frost	Plant in Shade	Protect from Wind
Acacia stenophylla *Shoestring Acacia*	■	■				■							■		■	y		■	■				
Acacia willardiana *Palo Blanco*	■	■				■							■	■		w		■	■				
Acer macrophyllum *Bigleaf Maple*	■		■							■				■			■		■				
Aesculus californica *California Buckeye*	■	■					■			■				■		w	■	■	■				
Agonis flexuosa 'After Dark' *Peppermint Tree*	■			■					■						■			■	■				
Arbutus unedo *Strawberry Tree*	■	■					■					■			■	pi		■	■				
Brachychiton discolor *Queensland Lacebark*	■	■	■								■			■	■	pi		■	■				
Brahea armata *Mexican Blue Palm*	■					■		■				■			■			■					
Butia capitata *Pindo Palm*	■					■		■					■		■			■					
Calamus caryotoides *Fishtail Palm*								■			■				■					■			
Callistemon citrinus *Lemon Bottlebrush*	■	■					■				■				■	r		■		■			
Callistemon viminalis *Weeping Bottlebrush*	■	■					■				■				■	r		■		■			
Calocedrus decurrens *Incense Cedar*			■									■			■		■	■					
Cedrus deodara *Deodar Cedar*				■							■				■					■			
Cercis occidentalis *Western Redbud*	■	■					■			■				■		pi	■	■		■			
Chilopsis linearis *Desert Willow*	■	■					■			■			■	■		w	■	■		■			
Chitalpa tashkentensis *(No Common Name)*	■	■					■			■				■		pu		■		■			
Citrus cultivars *Citrus*	■	■				■						■			■				■	■			

Trees	Habitat		Form						Zone					Characteristic					Cultural Needs			
	Bird	Pollinator	Tall Upright	Tall Broad	Large Spreading	Small Upright	Small Spreading	Palm	Campus Edge	California	Australia	Mediterranean	S. Africa/Chile	Deciduous	Evergreen	Flower Color	California Native	Drought Tolerant	Special Watering	Protect from Frost	Plant in Shade	Protect from Wind
Cupressus sempervirens 'Fastigiata' *Italian Cypress*																						
Eucalyptus citriodora *Lemon Scented Gum*																						
Eucalyptus sideroxylon *Red Ironbark*																						
Grevillea robusta *Silky Oak*																o						
Ficus macrophylla *Moreton Bay Fig*																						
Jubaea chilensis *Chilean Wine Palm*																						
Laurus nobilis *True Laurel*																						
Leucadendron argenteum *Silver Tree*																						
Lyanothamnus floribundus *Caltalina Ironwood*																w						
Maytenus boaria Mayten Tree																						
Melaleuca nesophila *Pink Melaleuca*																pi						
Melaleuca quinquenervia *Cajeput Tree*																						
Olea africana *African Olive*																						
Olea europaea *'Swan Hill'* *Fruitless Olive Tree*																						
Parkinsonia aculeata *Mexican Palo Verde*																y						
Parkinsonia floridum *Palo Verde*																y						
Phoenix canariensis *Canary Island Date Palm*																						
Phoenix dactylifera *Date Palm*																						

Trees	Habitat		Form						Zone					Characteristic					Cultural Needs			
	Bird	Pollinator	Tall Upright	Tall Broad	Large Spreading	Small Upright	Small Spreading	Palm	Campus Edge	California	Australia	Mediterranean	S. Africa/Chile	Deciduous	Evergreen	Flower Color	California Native	Drought Tolerant	Special Watering	Protect from Frost	Plant in Shade	Protect from Wind
Pinus canariensis *Canary Island Pine*	■		■								■	■			■			■				
Pinus pinea *Italian Stone Pine*	■				■							■			■			■	■			
Pinus torreyana *Torrey Pine*	■			■						■					■		■	■	■			
Platanus racemosa *California Sycamore*	■	■		■						■				■			■	■	■			
Punica granatum *Pomegranate*	■	■					■					■		■		o						
Podocarpus elongatus *Breeder River Yellow Wood*					■								■		■							
Podocarpus latifolius *Yellow Wood*					■								■		■							
Populus fremontii *Western Cottonwood*	■	■	■							■				■			■		■			
Prosopis chilensis *Chilean Mesquite*	■	■		■									■	■	■			■	■			
Quercus agrifolia *Coast Live Oak*	■	■			■					■		■			■		■	■	■			
Quercus chrysolepis *Canyon Live Oak*	■	■			■					■					■		■	■	■			
Quercus engelmannii *Mesa Oak*	■	■			■					■		■			■		■	■	■			
Quercus suber *Cork Oak*	■	■			■							■			■			■	■			
Salix laevigata *Red Willow*	■				■					■				■			■		■			
Sequoia sempervirens *'SantaCruz'* *Coast Redwood*	■	■	■							■					■		■	■				
Umbellularia californica *California Laurel*	■	■		■						■					■		■	■				
Vitex-agnus castus *Chaste Tree*	■	■		■								■			■	pu		■				
Washingtonia filifera *California Fan Palm*	■		■					■		■					■		■	■				

Shrubs, Perennials, Grasses, Cactus, Agaves, and Succulents	Habitat		Form							Zone					Characteristic					Cultural Needs			
	Birds	Pollinator	Large Spreading	Large Mounding	Large Upright	Low Spreading	Low Mounding	Ornamental Grass	Perennial Accent	Campus Edge	California	Australia	Mediterranean	S. Africa/Chile	Deciduous	Evergreen	Flower Color	California Native	Drought Tolerant	Special Watering	Protect from Frost	Plant in Shade	Protect from Wind
Achillea millefolium *Yarrow*		■				■			■		■					■	y,pi w,r	■	■				
Achillea filipendulina *Fernleaf Yarrow*		■				■			■	■	■					■	y, pi,	■	■				
Acacia cultriformis *Knife Acacia*		■		■					■			■				■	y		■	■	■			
Acacia greggii *Catclaw Acacia*		■		■					■		■			■	■		y				■		
Acacia redolens *Prostrate Acacia*		■		■					■			■				■			■		■		
Acanthus mollis *Bear's Breech*	■						■		■							■	y,w		■			■	
Agapanthus africanus African Lily									■					■		■	pu		■				
Agave 'Blue Glow' *Blue Glow Agave*	■				■						■					■			■		■		
Agave desertii *Desert Agave*	■						■				■					■			■		■		
Aloe africana *Spiny Aloe*	■								■					■		■			■		■		
Aloe barberae *Tree Aloe*	■				■				■					■		■	pi		■		■		
Aloe 'Blue Elf' *Blue Elf Aloe*	■						■							■		■			■		■		
Aloe vera *Coral Aloe*	■						■							■		■			■		■		
Alstroemeria spp. *Peruvian Lily*	■						■		■					■	■	■	pi,r		■				
Anigozanthos 'Big Red' *Big Red Kangaroo Paws*	■						■		■	■				■	■	■	y		■				
Anigozanthos 'Bush Sunset' *Kangaroo Paws*	■								■			■		■		■	r, y,o		■				
Anigozanthos flavidus Dwarf Kangaroo Paws	■								■			■		■		■	r, y,o		■				
Arctostaphylos 'Emerald Carpet' *Emerald Carpet Manzanita*		■				■					■					■	w	■	■				

Shrubs, Perennials, Grasses, Cactus, Agaves, and Succulents	Habitat		Form							Zone					Characteristic					Cultural Needs			
	Birds	Pollinator	Large Spreading	Large Mounding	Large Upright	Low Spreading	Low Mounding	Ornamental Grass	Perennial Accent	Campus Edge	California	Australia	Mediterranean	S. Africa/Chile	Deciduous	Evergreen	Flower Color	California Native	Drought Tolerant	Special Watering	Protect from Frost	Plant in Shade	Protect from Wind
Arctostaphylos glauca *Big Berry Manzanita*		■			■				■		■					■	w	■	■				
Arctostaphylos hookeri *Monterey Manzanita*		■	■	■					■		■					■	w, pi	■	■				
Arctostaphylos 'Howard McMinn' *McMinn Manzanita*		■		■					■		■		■			■	pi	■	■				
Artemisia californica *California Sagebrush*							■				■					■		■	■				
Artemisia 'Powis Castle' *(No Common Name)*							■						■			■			■				
Asclepias speciosa *Showy Milkweed*		■			■				■		■					■	pu, r	■	■				
Baccharis pilularis *Prostrate Coyote Brush*						■					■					■		■	■				
Berberis aquifolium *Oregon Grape*	■	■			■				■		■					■	y	■	■			■	
Berberis darwinii *Darwin's Barberry*	■	■			■				■					■		■	o	■	■		■		
Berberis 'Golden Abundance' *Golden Abundance Barberry*	■	■			■				■		■					■	y	■	■			■	
Calamagrostis foliosus *Mendocino Reed Grass*							■		■		■					■	w	■	■				
Calandrina grandiflora *Rock Purslane*	■								■					■		■	pu		■	■			
Callisetmon 'Little John' *(No Common Name)*	■	■					■		■	■		■	■			■	r		■				
Calycanthus occidentalis *Spice Bush*	■	■			■				■		■				■		pi	■	■			■	
Carex pansa *California Meadow Sedge*						■		■			■					■		■		■			
Carex spissa *San Diego Sedge*					■			■			■					■		■		■			
Carpenteria californica *Bush Anemone*		■			■						■					■	w	■	■				
Ceanothus 'Concha' *Concha Ceanothus*		■		■					■		■					■	b	■	■	■			

Shrubs, Perennials, Grasses, Cactus, Agaves, and Succulents	Habitat		Form							Zone					Characteristic					Cultural Needs			
	Birds	Pollinator	Large Spreading	Large Mounding	Large Upright	Low Spreading	Low Mounding	Ornamental Grass	Perennial Accent	Campus Edge	California	Australia	Mediterranean	S. Africa/Chile	Deciduous	Evergreen	Flower Color	California Native	Drought Tolerant	Special Watering	Protect from Frost	Plant in Shade	Protect from Wind
Ceanothus 'Joyce Coulter' *Joyce Coulter Ceanothus*																	b						
Ceanothus 'Ray Hartman' *Ray Hartman Ceanothus*																	b						
Chamelacium 'Matilda' *Waxflower*																	pi						
Cistus salviifolius Sageleaf Rockrose																	w						
Clivia miniata *Kaffir Lily*																	o						
Cocculus laurifolius *Laurel Leaf Snailsneed*																							
Coprosma 'Evening Glow' *Evening Glow Coprosma*																							
Cordyline australis *Giant Dracaena*																							
Cordyline 'Festival Grass' *Red Fountain Cordyline*																							
Correa alba *'Dusky Bells'*																	w						
Correa pulchella spp. *Pink Australian Fuschia*																	pi						
Cotyledon obriculata *Pig's Ear*																	pi						
Crassula corymbulosa 'Red Pagoda' *Red Pagoda Crassula*																	w						
Crassula capitella 'campfire' *Campfire Crassula*																	w						
Crassula lycopodioides *Watch Chain Crassula*																							
Dendromecon harfordii *Island Bush Poppy*																	y						
Dietes species *Fortnight Lily*																	w						
Dodonea viscosa *Hopseed bush*																							

Shrubs, Perennials, Grasses, Cactus, Agaves, and Succulents	Habitat		Form							Zone					Characteristic					Cultural Needs			
	Birds	Pollinator	Large Spreading	Large Mounding	Large Upright	Low Spreading	Low Mounding	Ornamental Grass	Perennial Accent	Campus Edge	California	Australia	Mediterranean	S. Africa/Chile	Deciduous	Evergreen	Flower Color	California Native	Drought Tolerant	Special Watering	Protect from Frost	Plant in Shade	Protect from Wind
Echinocactus grusonii *Golden Barrel cactus*																							
Echium candicans *Pride of Madeira*																	pu						
Encelia californica *Coastal Encelia*																	y						
Elaeagnus pungens *Silverberry*																							
Epilobium canum *California Fuchsia*																	r						
Eremophila racemosa *Easter Egg Emu Bush*																	pi, o,y						
Euphorbia characias *Large Mediterranean Spurge*																							
Festuca californica *California Fescue*																							
Festuca glauca *Blue Fescue*																							
Festuca mairei *Atlas Fescue*																							
Festuca rubra *Red Fescue*																							
Fouquieria splendens *Ocotillo*																	r						
Fremontodendron californicum *California Flannel Bush*																	y						
Galvezia speciosa *Island bush-snapdragon*																	r						
Garrya elliptica 'James Roof' *Silktassel*																	w						
Grevillea species *(No Comon Name)*																	pi,w , r						
Grewia occidentalis *Lavendar Star Flower*																	pu						
Helianthemum cultivars *Rock Rose*																	y, pi, r						

Shrubs, Perennials, Grasses, Cactus, Agaves, and Succulents	Habitat		Form							Zone					Characteristic					Cultural Needs			
	Birds	Pollinator	Large Spreading	Large Mounding	Large Upright	Low Spreading	Low Mounding	Ornamental Grass	Perennial Accent	Campus Edge	California	Australia	Mediterranean	S. Africa/Chile	Deciduous	Evergreen	Flower Color	California Native	Drought Tolerant	Special Watering	Protect from Frost	Plant in Shade	Protect from Wind
Helictotrichon sempervirens *Blue Oat Grass*							■	■	■				■			■			■				
Heteromeles arbutifolia *Toyon*	■	■		■							■					■		■	■				
Jasminum mesnyi *Primrose jasmine*				■					■			■				■	y		■				
Juncus patens *Caliornia Gray Rush*							■				■					■		■		■			
Juncus textilis Basket Rush							■				■					■		■		■			
Juniperus californica *California Juniper*	■			■							■					■		■	■				
Juniperus chinensis 'Torulosa' *Hollywood Juniper*	■				■						■	■				■			■				
Juniperus chinensis var. sargentii *(No Common Name)*	■						■					■				■			■				
Juniperus chinensis 'Sea Green' *(No Common Name)*	■				■							■				■			■				
Juniperus x pfitzeriana 'Aurea' *(No Common Name)*	■			■								■				■			■				
Juniperus x pfitzeriana 'Glauca' *(No Common Name)*	■			■								■				■			■				
Justicia californica *Chuparosa*	■			■					■		■					■	o, r	■	■				
Kniphofia Spp. Red Hot Poker	■						■		■					■		■	o, r						
Lantana camara *Yellow Sage*		■				■						■				■	pu		■				
Lavandula angustifolia *English Lavender*		■					■		■				■			■	pu		■				
Lavandula stoechas *Spanish Lavender*	■	■					■		■				■			■			■				
Lavatera assurgentiflora *Tree Mallow*	■	■		■					■		■					■	pi	■	■				
Leonotis leonorus *Lion's Tail*	■	■		■					■				■			■	o				■		

Shrubs, Perennials, Grasses, Cactus, Agaves, and Succulents	Habitat		Form							Zone					Characteristic					Cultural Needs			
	Birds	Pollinator	Large Spreading	Large Mounding	Large Upright	Low Spreading	Low Mounding	Ornamental Grass	Perennial Accent	Campus Edge	California	Australia	Mediterranean	S. Africa/Chile	Deciduous	Evergreen	Flower Color	California Native	Drought Tolerant	Special Watering	Protect from Frost	Plant in Shade	Protect from Wind
Leymus cinereus *Gray Wild Rye*																							
Leptospermum laevigatum *Australian Tea Tree*																	pi						
Leucadendron linifolium *Lineleaf Conebush*																							
Leucadendron jester *Sunshine Conebush*																							
Leucandendron salignum 'Blush' *Willow Cone Bush*																							
Leucospermum c. 'Flame Giant' *Giant Orange Nodding Pincushion*																	o						
Lomandra longifolia 'Breeze' *Matt Rush*																							
Melaleuca armillaris *Drooping Melaleuca*																	w						
Melianthus major *Honey Bush*																							
Mimulus guttatus *Seep Monkey Flower*																	y						
Muhlenbergia rigens *Deer Grass*																							
Muhlenbergia lindheimeri *Lindheimer's Muhly*																							
Nassella pulchra *Purple Needle Grass*																	pu						
Pelargonium spp. *(No Common Name)*																	w,r pi						
Penstemon hybrids *Bearded Tongue*																	pi, pu						
Phlomis fruticosa *Jerusalem Sage*																	y						
Photinia x fraseri *Fraser photinia*																	w						
Plumbago auriculata *Cape Plumbago*																	b, w						

Shrubs, Perennials, Grasses, Cactus, Agaves, and Succulents	Habitat		Form							Zone					Characteristic					Cultural Needs			
	Birds	Pollinator	Large Spreading	Large Mounding	Large Upright	Low Spreading	Low Mounding	Ornamental Grass	Perennial Accent	Campus Edge	California	Australia	Mediterranean	S. Africa/Chile	Deciduous	Evergreen	Flower Color	California Native	Drought Tolerant	Special Watering	Protect from Frost	Plant in Shade	Protect from Wind
Punica granatum 'Nana' *Pomegranate*	■	■					■						■		■		o		■				
Rhus ovata *Sugar Bush*	■	■		■					■		■					■	pi	■	■				
Romneya coulteri *Matilija Poppy*	■	■			■				■		■		■			■	w	■	■				
Rosa californica *Californica Wild Rose*		■				■			■		■				■		pi	■	■				
Rosmarinus officinalis *Rosemary*		■				■	■					■	■			■	b		■				
Salvia 'Allen Chickering' *Allen Chickering Sage*	■	■					■		■				■			■	pu		■				
Salvia clevelandii *Cleveland Sage*	■	■		■					■				■			■	pu		■				
Salvia greggii *Autumn Sage*	■	■					■		■				■			■	pu, r, pi		■				
Salvia leucantha *Mexican Sage*	■	■		■					■				■			■	pu		■				
Senecio spp. *Blue Chalk Sticks*						■						■	■	■		■			■		■		
Sisirinchium bellum *Blue-Eyed Grass*		■					■	■	■		■					■	b	■	■				
Stachys byzantina *Lamb's Ear*		■					■		■				■			■	pu		■				
Strelitzia reginae *Bird of Paradise*					■									■		■			■				
Tecoma capensis *Cape Honeysuckle*	■		■						■			■		■		■	o		■				
Thymus species *Thyme*		■				■			■				■			■	pu		■				
Trichostema lanatum *Woolly Blue Curls*	■	■				■			■		■					■	pu	■	■				
Vitex agnus-castus *Chaste Tree*		■			■				■				■		■		pu		■				
Westringia fruticosa *Coast Rosemary*		■					■		■			■				■	w		■				

Shrubs, Perennials, Grasses, Cactus, Agaves, and Succulents	Habitat		Form							Zone					Characteristic					Cultural Needs			
	Birds	Pollinator	Large Spreading	Large Mounding	Large Upright	Low Spreading	Low Mounding	Ornamental Grass	Perennial Accent	Campus Edge	California	Australia	Mediterranean	S. Africa/Chile	Deciduous	Evergreen	Flower Color	California Native	Drought Tolerant	Special Watering	Protect from Frost	Plant in Shade	Protect from Wind
Westringea 'Wynyabbie Gem' *(No Common Name)*																	pu						
Xylosma congestum 'Compacta' *Shiny Xylosma*																							

	Habitat		Form						Zone				Characteristic					Cultural Needs			
Ground Covers	Birds	Pollinators	Low	Mounding	Shrubby	Small Areas	Large Areas	Perennial Accent	California	Australia	Mediterranean	S. Africa/Chile	Deciduous	Evergreen	Flower Color	California Native	Drought Tolerant	Special Watering	Protect from Frost	Plant in Shade	Protect from Wind
Achillea millefolium *Fernleaf Yarrow*															y,r, pi, w						
Aptenia cordifolia *Hearts and Flowers*																					
Arctostaphylos 'Emerald Carpet' *Dwarf Manzanita*															pi, w						
Arctostaphylos uva-ursi 'Point Reyes' *Dwarf Manzanita*															pi, w						
Arctotheca calendula *Cape Weed*															y						
Baccharis pilularis 'TwinPeaks' *Coyote Brush*																					
Berberis repens *Creeping Barberry*															y						
Bougainvillea spectabilis *Bougainvillea*															r						
Ceanothus g. hor. 'Santa Ana' *Carmel Creeper*															b						
Ceanothus maritimus *Maritime Ceanothus*															b						
Dalea greggii *Trailing Indigo Bush*															b						
Delosperma cooperi *Hardy Ice Plant*															pu						
Dymondia margarete Dymondia															y						
Eriogonum fasciculatum 'Dana Point' *Dana Point Buckwheat*																					
Eriogonum f. 'Theodore Payne' *Theodore Payen Buckwheat*																					
Euphorbia rigida *Silver Spurge*															y						
Fragaria chiloensis *Sand Strawberry*															w						
Gazania rigens *Trailing Gazania*															y						

Ground Covers	Habitat		Form						Zone				Characteristic					Cultural Needs			
	Birds	Pollinators	Low	Mounding	Shrubby	Small Areas	Large Areas	Perennial Accent	California	Australia	Mediterranean	S. Africa/Chile	Deciduous	Evergreen	Flower Color	California Native	Drought Tolerant	Special Watering	Protect from Frost	Plant in Shade	Protect from Wind
Grevillea spp. *(No Common Name)*															pi						
Hedera canariensis *Akgerian Ivy*																					
Heuchera maxima *Island Alum Root*															pi						
Heuchera sanguinea *Coral Bells*															pi						
Iva hayesiana *San Diego Marsh Elder*																					
Lantana c. 'Spreading Sunshine' *Yellow Lantana*															y						
Lantana montevidensis *Trailing Lantana*															p						
Leymus triticoides *Creeping Wildrye*																					
Mahonia repens *Creeping Mahonia*															y						
Myoporum parvifolium 'Pacific Creek' *Creeping Myoporum*															w						
Osteosperum fruticosum *Trailing African Daisy*															pu						
Ribes viburnifolium *Catalina Perfume*																					
Rosmarinus o. 'Lockwood de Forest' *Prostrate Rosemary*															b						
Rosmarinus o. 'Prostratus' *Prostrate Rosemary*															b						
Salvia 'Bee's Bliss' *Bee's Bliss Sage*															b						
Salvia l. 'Point Sal Spreader' *Point Sal Spreader Sage*															b						
Salvia sonomensis *Creeping Sage*															b						

Vines and Espaliers	Habitat		Form					Zone				Characteristic					Cultural Needs			
	Birds	Pollinator	Large	Small	Vine	Espalier	Self Clinging	California	Australia	Mediterranean	S. Africa/Chile	Deciduous	Evergreen	Flower Color	California Native	Drought Tolerant	Special Watering	Protect from Frost	Plant in Shade	Protect from Wind
Beaumontia grandiflora *Easter Lily Vine*														w						
Bougainvillea sp. *Bougainvillea*														r, pi o,						
Citrus cultivars *Citrus*																				
Cissus antartica *Kangaroo Vine*																				
Cissus hypoglauca *Water Vine*																				
Clematis lasiantha *Chaparral Clematis*														w						
Clytostoma callistegioides Violet Trumpet Vine														pi						
Distictis buccinatoria *Blood-Red Trumpet Vine*														r						
Ficus pumila *Creeping Fig*																				
Hardenbergia comptoniana *(No Common Name)*														pu						
Jasminum angulare *South African Jasmine*														w						
Jasminum humile *Italian Jasmine*														w, pi						
Jasminum officinale *Poet's Jasmine*														w						
Lonicera hispidula *Twin Berry*														w, y						
Lonicera subspicata *Chaparral Honeysuckle*														pi						
Mandevilla laxa *Chilean Jasmine*														w						
Pandorea jasminoides Bower Vine														w, pi						
Pandorea pandorana *Wonga Wonga Vine*														w, y						

Vines and Espaliers	Habitat		Form					Zone				Characteristic					Cultural Needs			
	Birds	Pollinator	Large	Small	Vine	Espalier	Self Clinging	California	Australia	Mediterranean	S. Africa/Chile	Deciduous	Evergreen	Flower Color	California Native	Drought Tolerant	Special Watering	Protect from Frost	Plant in Shade	Protect from Wind
Punica granatum *Pomegranate*	■	■		■		■						■		o		■				
Pyrostegia venusta *Flame Vine*	■				■								■	o						
Solandra maxima *Cup-of Gold Vine*	■	■	■		■								■	y				■		
Solanum laxum Potato Vine	■	■	■		■				■				■	w						
Thunbergia gregorii *Orange Clock Vine*		■	■		■						■		■	o		■				
Vitis californica *California Wild Grape*	■	■			■			■				■			■	■		■		

Appendix B: Technical Reports

B.1: Traffic Engineering Report

The **University Village** is an urban design concept within the CSUDH 2018 Master Plan that integrates the academic core and the student residential community with a neighborhood of retail and business communities and campus apartment housing to create a live/work/play environment with synergistic connections to the University's mission and purpose. Unless otherwise noted, the Design Guidelines analyses and reports appearing in this Appendix address all the parcels of the University Village.

Introduction

California State University - Dominguez Hills (CSUDH) is developing a Master Plan to guide the development and growth of the campus over the next 20 years and beyond. The Master Plan includes new campus-serving uses including academic facilities and student residences, as well as a new retail, residential, and parking development program for the east side of campus, University Village, which will include campus apartment housing, campus business park, and retail space.

In order to develop recommendations for the transportation facilities necessary to support the full build-out of the Master Plan, Fehr & Peers undertook an analysis that included the following components:

- Assessment of existing vehicle volumes at key intersections surrounding the campus
- Trip generation analysis of proposed Master Plan build-out conditions, including the University Village components
- Zip-code analysis of existing students, faculty and staff to understand the geographic distribution of campus visitors
- Parking utilization study to understand existing parking patterns and overall parking demand
- AutoTURN analysis to determine required roadway widths and turning radii to support buses, fire trucks, and passenger vehicles
- Assessment of proposed bicycle facilities to ensure safe, comfortable access for bicyclists throughout campus

Based on the above analysis, this report provides recommendations on the transportation facilities needed to support the increased intensity of use that is included within the Master Plan. This report includes the following sections:

- Existing Conditions
  - Circulation and access
  - Bicycle and pedestrian facilities
  - Parking
  - Transit services
- Transportation Facilities to Support Proposed Master Plan
  - Circulation and access
  - Bicycle facilities
  - Parking
  - Transit hub

Existing Conditions

This section briefly describes the existing transportation facilities within the CSUDH Master Plan area, including a description of surrounding streets and freeways, transit, existing and planned bicycle facilities, and the parking resources currently on the site.

CIRCULATION AND ACCESS

Circulation throughout the Plan area and to the adjacent University campus buildings is provided by internal campus roads including Pacific View, Birchknoll, Dominguez Hills Parkway West, Glenn Curtiss, Unity, International, and Dominguez Hills (frontage road to Victoria Street). Additional circulation through the area with student housing is provided behind gates, and offers residents adjacent, head-in parking and slow-speed, 1-way travel.

Local access to the site is provided via the following arterials:

- **Victoria Street** – Victoria Street has two travel lanes in each direction, raised or painted median, turn pockets, and on-street parking.
- **Central Avenue** – Central Avenue has two travel lanes in each direction, raised median, turn pockets, and on-street parking is prohibited.
- **University Drive** – University Drive has two travel lanes in each direction, raised median or painted median, turn pockets, bike lane in each direction, and on-street parking is prohibited.
- **Avalon Boulevard** – Avalon Boulevard has three travel lanes in each direction, raised median, turn pockets, and very limited on-street parking.

Regional access to the site is provided via the following freeways:

- **SR-91** – Approximately ½ mile north of the Plan area, with ramps near Central Avenue and Avalon Boulevard.
- **I-110** – Approximately 1¾ miles west of the Plan area, with ramps near Victoria Street.
- **I-405** – Approximately two miles southwest of the Plan area, with ramps near Avalon Boulevard.

BICYCLE AND PEDESTRIAN FACILITIES

There is a bike lane present on University Drive that extends from Avalon Boulevard to Wilmington Avenue, approximately ¾ mile east of the campus. However, the posted speed of 45 mph along

University Drive provides an unappealing environment for bicycling. The bike lane on University Drive connects to bike lanes extending south of the campus to Del Amo Boulevard along Central Avenue and Avalon Boulevard. There are no bicycle facilities that provide access to the campus from the east, west or north.

There are sidewalks on both sides of Victoria Street between Avalon Boulevard and Central Avenue. There is a continuous sidewalk on the east side of Avalon Boulevard between Victoria Street and University Drive. The sidewalk on the west side of Avalon Boulevard is not continuous because it drops back to the frontage road in several locations. Pedestrian facilities along Avalon Boulevard or the adjacent frontage road are present between Victoria Street and University Drive. There are sidewalks on both sides of University Drive between Avalon Boulevard and Pepperdine Drive. Between Pepperdine Drive and Central Avenue, there is only a paved sidewalk on the south side of University Drive, with the exception of a 500-foot paved sidewalk segment on the north side of University Drive, just west of Central Avenue. There are sidewalks on both sides of Central Avenue, between Victoria Street and University Drive.

There are marked crosswalks across all intersection legs at the intersections of Victoria Street and Avalon Boulevard, Victoria Street and Central Avenue, and University Drive and Central Avenue. At the intersection of University Drive and Avalon Boulevard, there is a marked yellow crosswalk across University Drive on the east leg of the intersection. Additional marked crosswalks provide pedestrian access to the campus at Victoria Street/Tamcliff Avenue, Victoria Street/Birchknoll Drive, and Central Avenue/Glenn Curtiss Street.

PLANNED FACILITIES

The following bicycle facility improvements are proposed in the 2013 City of Carson Master Plan of Bikeways:

- University Drive, between Avalon Boulevard and Central Avenue:
  - Option 1: Colored bike lane
  - Option 2: Road diet with two-way cycletrack and 6’ bike lane with 3’ buffer
- Victoria Boulevard, between Avalon Boulevard and Central Avenue:
  - Option 1: 6’ bike lanes with 2’ buffers
  - Option 2: 15’ two-way cycletrack
- Avalon Boulevard, between Victoria Street and University Drive:
  - Option 1: 6’ colored northbound bike lane and 6’ colored southbound bike lane with 2’ buffer
  - Option 2: 15’ two-way cycletrack
- Central Avenue, between University Drive and Victoria Street:
  - Option 1: 6’ colored bike lanes with 4’ buffers on both sides
  - Option 2: 12’ cycletrack and 6’ bike lane with 4’ buffer, with bike signals at intersections
  - Option 3: Add “Bike Path” signage and pavement markings on path, with signage notifying motorists of crossing bicyclists at intersections

PARKING

In the Plan area, parking is currently provided on 20 surface lots and parking areas, totaling over 4,800 spaces. Table 1 (on page A-4) contains an inventory of parking spaces in each lot. Parking on campus is paid at a rate of $15.39 per month for faculty, $110 per semester for students, and $6 per day for visitors.

TRANSIT SERVICE

CSUDH operates a shuttle for students, connecting the campus to the Metro Silver Line and the Metro Blue Line. The shuttle is free for students and runs Monday through Thursday.

Additional transit serving the campus includes the following nearby routes:

- **Metro Bus Line 130** – Line 130 travels east/west along Victoria Street, connecting the campus to the Metro Silver Line to the west and the Metro Blue Line to the east.
- **Metro Bus Line 53** – Line 53 travels north/south along Central Avenue (terminating at Victoria Street), connecting the campus to Downtown Los Angeles.
- **Metro Bus Line 205** – Line 205 travels north/south along Avalon Boulevard, connecting the campus to San Pedro, Harbor-UCLA Medical Center, and the Metro Blue and Green Lines.
- **Metro Bus Line 246** – Line 246 travels north/south along Avalon Boulevard, connecting the campus to San Pedro and the Harbor Gateway Transit Center.
- **Metro Bus Line 45** – Line 45 runs north/south along Avalon Boulevard, connecting the campus with Downtown Los Angeles and Lincoln Heights. This line extends to the Plan Area during Owl Service only.
- **Metro Bus Line 52** – Line 52 runs east/west along Victoria Street and north/south along Avalon Boulevard north of CSUDH, connecting the campus with Harbor Gateway Transit Center, Downtown Los Angeles and Koreatown.
- **Torrance Transit Line 6** – Line 6 travels west on Victoria to Figueroa Street and north on

TABLE 1 PARKING INVENTORY

LOT #	REGULAR	HANDICAP	RESERVED	CARPOOL/ VANPOOL	ELECTRIC VEHICLE	FACULTY/ STAFF	TIME LIMITED	MOTOR-CYCLE	TOTAL SPACES
1	528	3	10	0	0	0	5	0	546
2	543	33	15	0	4	83	5	0	683
3	553	25	21	23	6	24	22	8	682
4A	255	10	2	0	0	0	4	9	280
4B	250	0	0	0	0	0	0	0	250
5A	132	13	9	0	0	0	5	3	162
5B	164	11	9	0	0	0	0	3	187
6A	552	0	0	0	0	0	0	0	552
6B	192	29	0	14	0	61	0	0	296
7A	482	0	7	0	0	0	0	5	494
7B	520	14	0	0	0	0	0	0	534
8 (Central Plant)	7	1	0	0	1	0	0	0	9
9 (ERC/La Corte Hall)	0	4	0	0	2	0	6	0	12
10 (Gym)	0	4	1	0	0	0	4	0	9
11 (North Welch Hall)	0	8	2	0	0	0	7	0	17
12 (West Welch Hall)	0	2	6	0	0	0	0	0	8
13 (Natural Sciences Lower)	0	2	0	0	0	0	2	0	4
14 (Natural Sciences Upper)	0	6	0	0	0	0	6	0	12
15 (Physical Plant)	0	3	0	0	2	0	26	0	31
16 (South Academic Complex)	0	8	0	0	0	0	7	0	15
17 (Social Behavioral Sciences)	0	0	16	0	0	0	4	0	20
18 (School of Ed.)	0	9	0	0	0	0	1	0	10
19 (Theater)	0	2	0	0	0	0	6	0	8
20 (Small College Complex)	0	0	6	0	0	0	20	0	26
Total	4,178	187	104	37	15	168	130	28	4,847

Source: National Data Services, Inc. and Fehr & Peers, November 2016.

Central to Walnut Street, connecting the campus to Torrance Civic Center, Metro Silver Line, and Metro Blue Line.

- **Long Beach Transit Line 1 –** Line 1 travels west on Victoria Street and south on Avalon Boulevard, connecting the campus to Downtown Long Beach and the Metro Blue Line.
- **Carson Circuit Route A –** Line A runs north/south along Avalon Boulevard and east/west along Victoria Street and University Drive, connecting the campus with the South Bay Pavilion and several residential areas in Carson to the east and south.
- **Carson Circuit Route E –** Line E runs north/south along Avalon Boulevard, connecting the campus with the South Bay Pavilion and several residential areas in Carson to the east and south.

Table 2 presents the number of daily bus boardings and alightings at seven of the bus stops on or adjacent to the CSUDH campus. The on-campus stop and the Avalon & Victoria stop see the most daily activity. This table includes available data from Metro and Long Beach Transit, but does not include data from the Carson Circuit or Torrance Transit.

TABLE 2 DAILY RIDERSHIP ACTIVITY

Bus Stop Location	Boardings	Alightings	Total Boardings + Alightings
Avalon & Victoria	433	427	860
Avalon & 185th St	32	27	59
Avalon & University	63	64	127
Rainsbury & Victoria	7	7	14
Tamcliff & Victoria	167	161	328
CSUDH Campus	378	341	719
Central & Victoria	54	76	130

Source: LA County Metro, Long Beach Transit, October 2014, via the Metro Active Transportation Strategic Plan.

EXISTING TRAFFIC PATTERNS

Traffic counts were collected on November 2, 2016 at three entry/exit driveways on campus: Tamcliff Avenue at Victoria Street, Birchknoll Drive at Victoria Street, and Toro Center Drive at University Drive. Figure 1 and Figure 2 provide a summary of the share of total vehicles counted that entered and exited campus at each of the three locations during the AM and PM peak hours, respectively. This analysis shows that the Birchknoll entrance to campus is the most heavily used of the three that were counted, likely due in large part to the three large parking lots that can be accessed from Birchknoll. During the AM peak hour, over 2/3 of vehicles entering or exiting campus used the driveways along Victoria Street. During the PM peak hour, over 75% of vehicles entering or exiting campus used those driveways.

Fehr & Peers also conducted a geographic distribution analysis of the residential location of students, staff and faculty to understand existing commute routes and future campus access points at full build-out of the Master Plan. The results of this analysis are presented in Figures 3, 4 and 5. Figure 3 shows that students are concentrated in areas such as Carson, Hawthorne, South Gate, and Norwalk, with geographic distribution to the south, northeast, and northwest of campus within approximately 10 miles of campus. Figure 4 illustrates a concentration of staff members in and around Carson, with additional concentrations to the west and east of campus in areas such as Torrance and Lakewood. Faculty residential location is concentrated predominantly to the west/southwest and east/southeast of campus, as shown in Figure 5.

The driveway counts and geographic distribution of students, faculty and staff were used in identifying primary gateway points and primary circulation routes at the full Master Plan buildout, as discussed in the next section of this report.

Figure 1

AM Peak Hour Driveway Distribution

Figure 2

PM Peak Hour Driveway Distribution

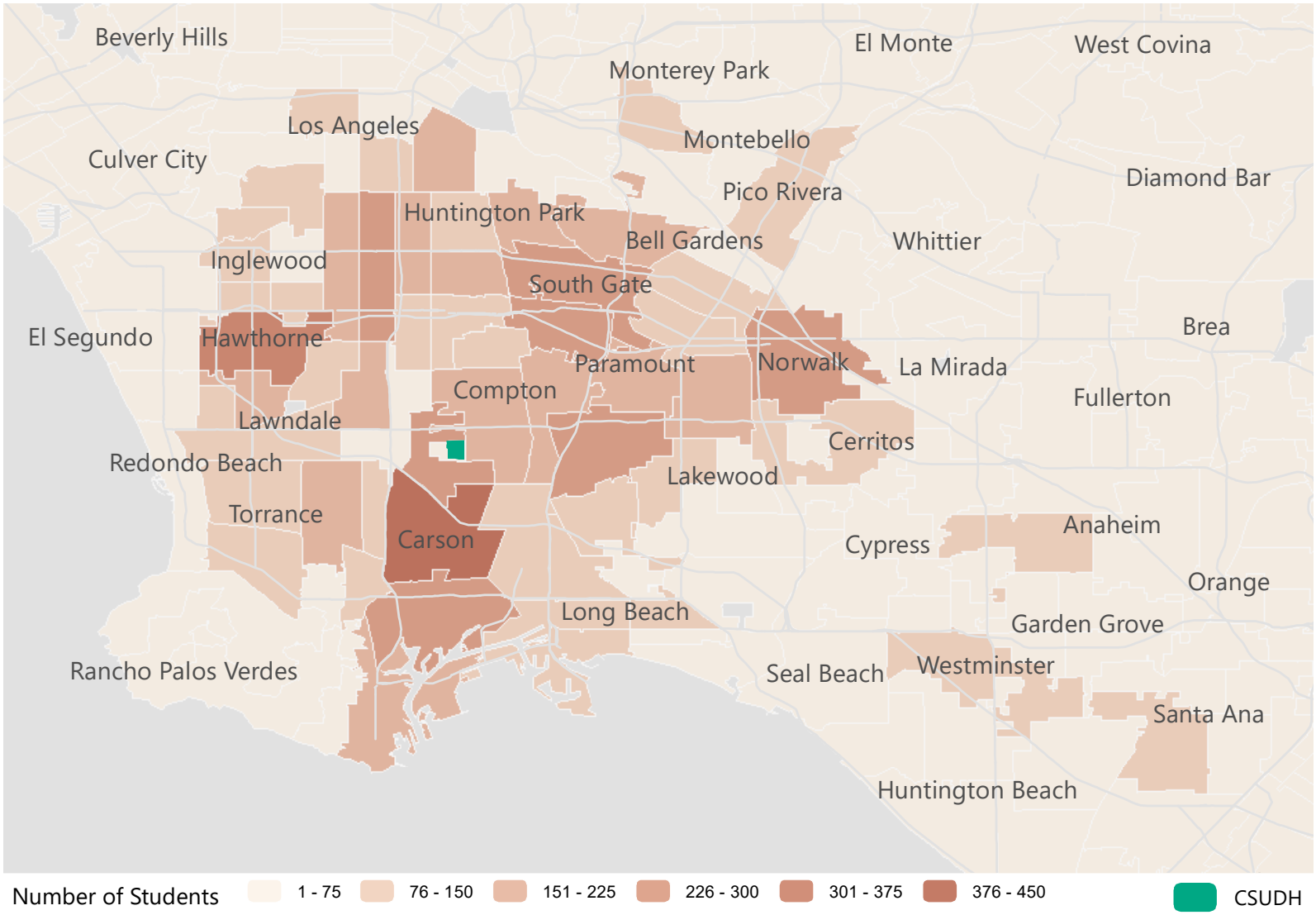


Figure 3

Student Distribution by Zip Code

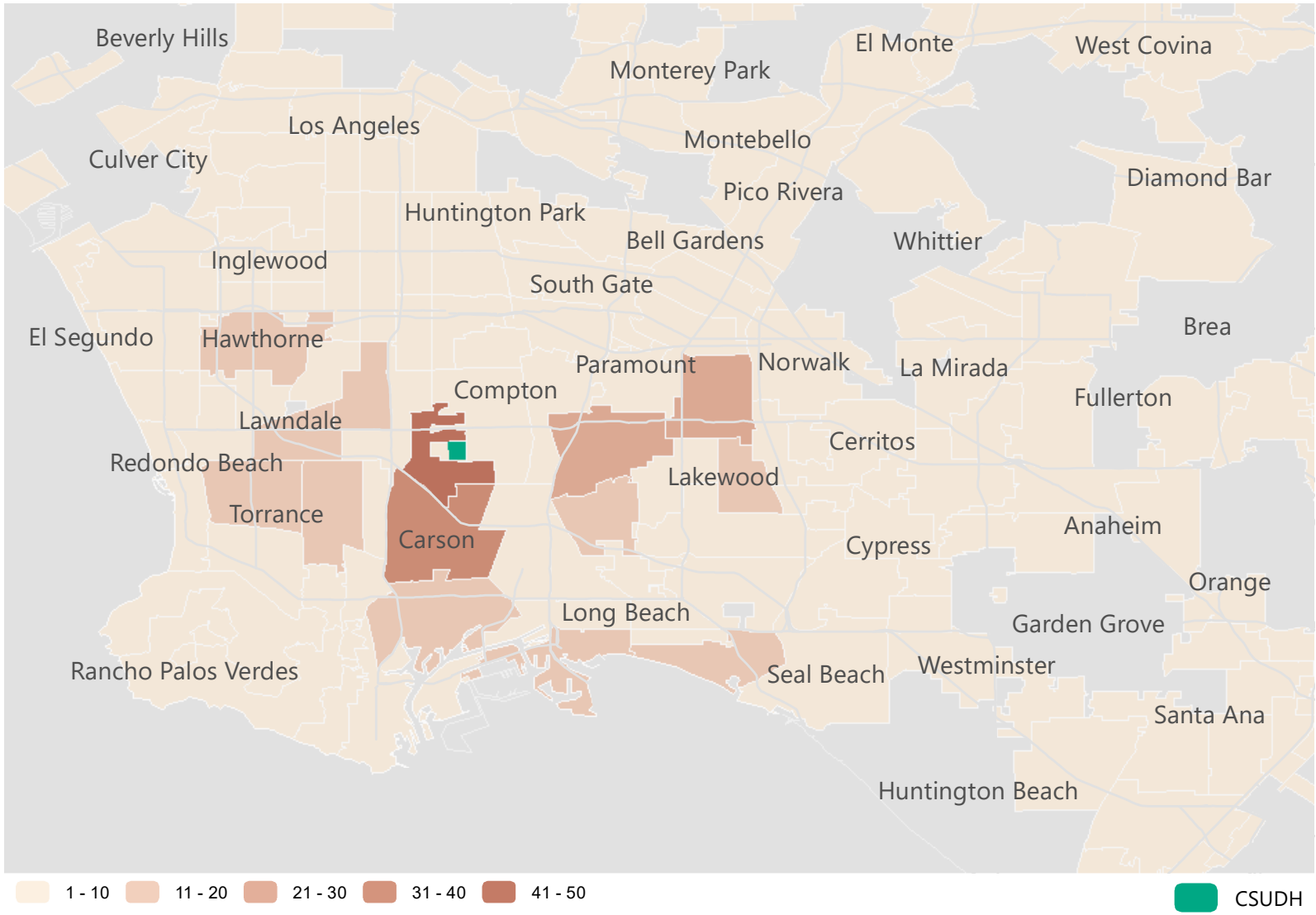


Figure 4

Staff Distribution by Zip Code

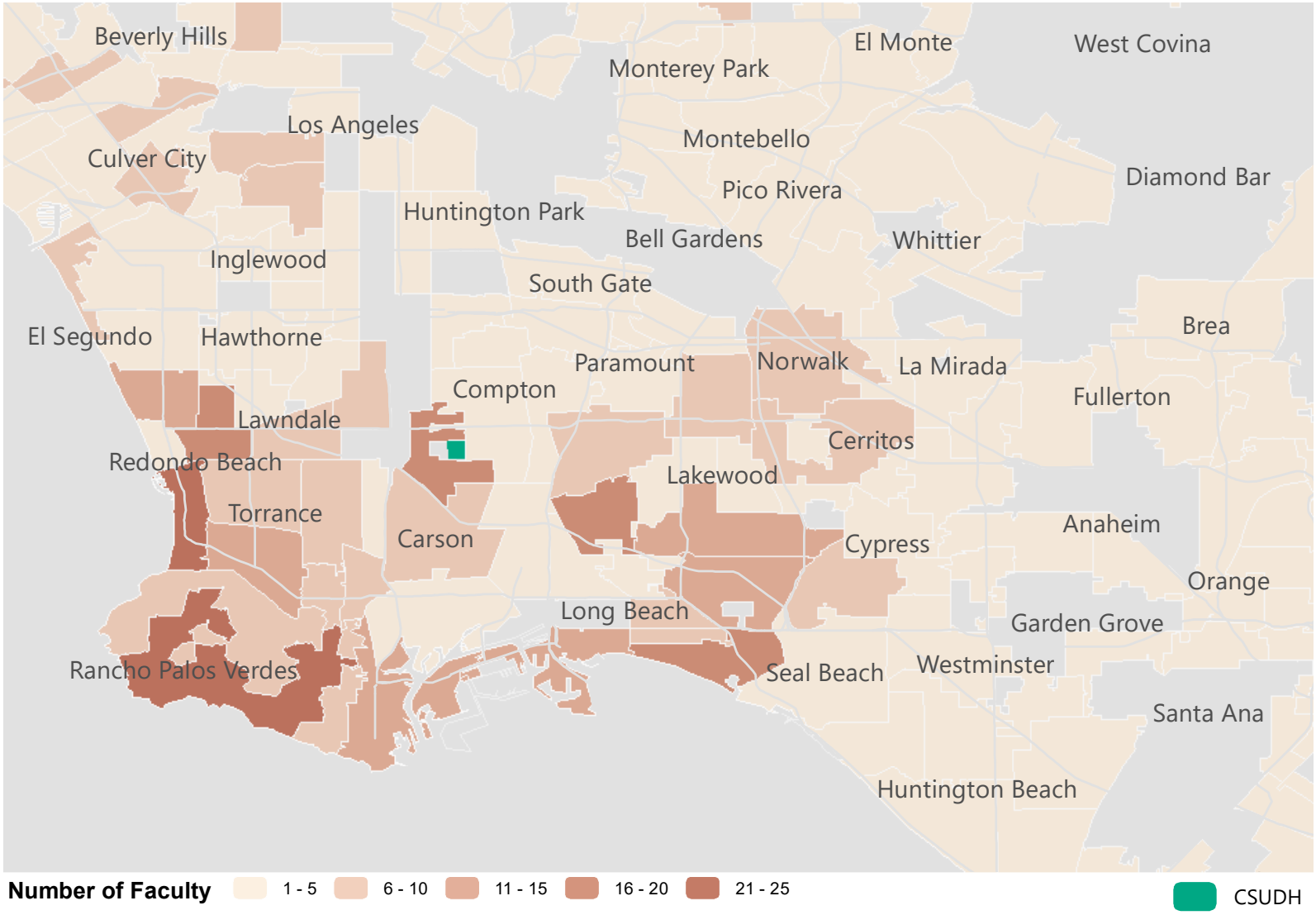


Figure 5

Faculty Distribution by Zip Code

Transportation Facilities To Support Proposed Master Plan

This section describes the transportation facilities necessary to support the proposed CSUDH Master Plan, including recommendations on circulation and access, bicycle facilities, parking and the transit hub.

CIRCULATION AND ACCESS

Figure 6 depicts the recommended circulation patterns throughout campus. This diagram illustrates where the primary vehicle routes should be constructed, based on the location of parking and informed by the geographic distribution of people accessing campus and existing access patterns. In general, parking resources are located towards the edge of campus, with the primary vehicle routes supporting the heaviest volumes of vehicles to the outside of the parking lots and structures. This maintains a strong pedestrian core to the campus, with safer and more pleasant pedestrian access from the parking lots and structures, and from the transit hub, into the central parts of campus. Secondary vehicle routes will support lower volumes of vehicles while still allowing for circulation throughout the campus.

Figure 6 also specifies the recommended number of lanes for each road that would be necessary to support the estimated vehicle volumes and provide bicycle access throughout the site, at full build-out. Primary circulation assumes two lanes in each direction and secondary vehicle circulation assumes one lane in each direction. Figure 7 provides roadway cross-section examples at several locations throughout campus, illustrating the variety of roadway facilities proposed in the Master Plan.

New traffic signals may be considered at several locations to facilitate improved safety and operations at locations where internal campus roadways intersect with Victoria Street, Central Avenue, and University Drive. These locations are illustrated in Figure 6, and should be analyzed further under City of Carson guidelines for signal warrants as the Master Plan is implemented.

Barrier gates could be used at several locations to encourage vehicle circulation on the roadway facilities that have been designated for primary circulation. Key-card and pre-timed gate operations would allow for circulation of service vehicles the majority of the time, while allowing for passenger vehicle circulation during StubHub Center events and other special events.

Most students, faculty, and staff are anticipated to access parking in Lot 3 or Structure 6 from Dominguez Hills Parkway, which will act a primary circulation facility with two travel lanes in each direction. This allows for Tamcliff Avenue to serve as a key entry-point into campus for visitors, bicyclists, and pedestrians. For new visitors to campus, a visitor information booth is planned on Tamcliff Avenue. Visitors will be able to pull through the far right travel lane to receive information about the campus, locations of events, and guidance on parking. They will then be able to proceed directly to Parking Lot 3. A turnaround area is also provided along Tamcliff Avenue to allow for passenger drop-off and pick-up. Fehr & Peers conducted turning movement analysis to ensure the proposed turnaround on Tamcliff Avenue can accommodate emergency vehicles. Low volumes on Tamcliff Avenue will facilitate an improved environment for pedestrians and bicyclists. Bicyclists will have access to Class II bike lane facilities along Tamcliff, and will be required to dismount in the pedestrian-oriented core of the campus. A photo illustrating an example of an information booth along with bike lanes in campus setting is shown in Figure 8.

Since the construction of the Master Plan is likely to occur in phases, Table 3 provides general recommended minimum widths for each roadway component that could be constructed for vehicles, bicycles, and pedestrians. This provides flexibility in determining the needs of each facility if the phasing results in a different configuration than the circulation plan shown in Figure 6.

TABLE 3 RECOMMENDED ROADWAY FACILITY WIDTHS

Facility	Recommended Widths
Travel lanes (includes transit lanes)	10 – 12 feet
Space for curb and gutter	4 feet per roadway
Class I Two-Way Bike Path	12 feet
Class II Bile Lanes or Class II+ Buffered Bike Lanes	5 – 8 feet
Class IV Protected Bike Lanes	8 feet
Sidewalk	Minimum 8 feet
Parallel Parking	8 feet
Angled Parking	16 feet
90 Degree (Perpendicular) Parking	20 feet
Curb radii	10 – 15 feet in most cases

Source: Fehr & Peers.

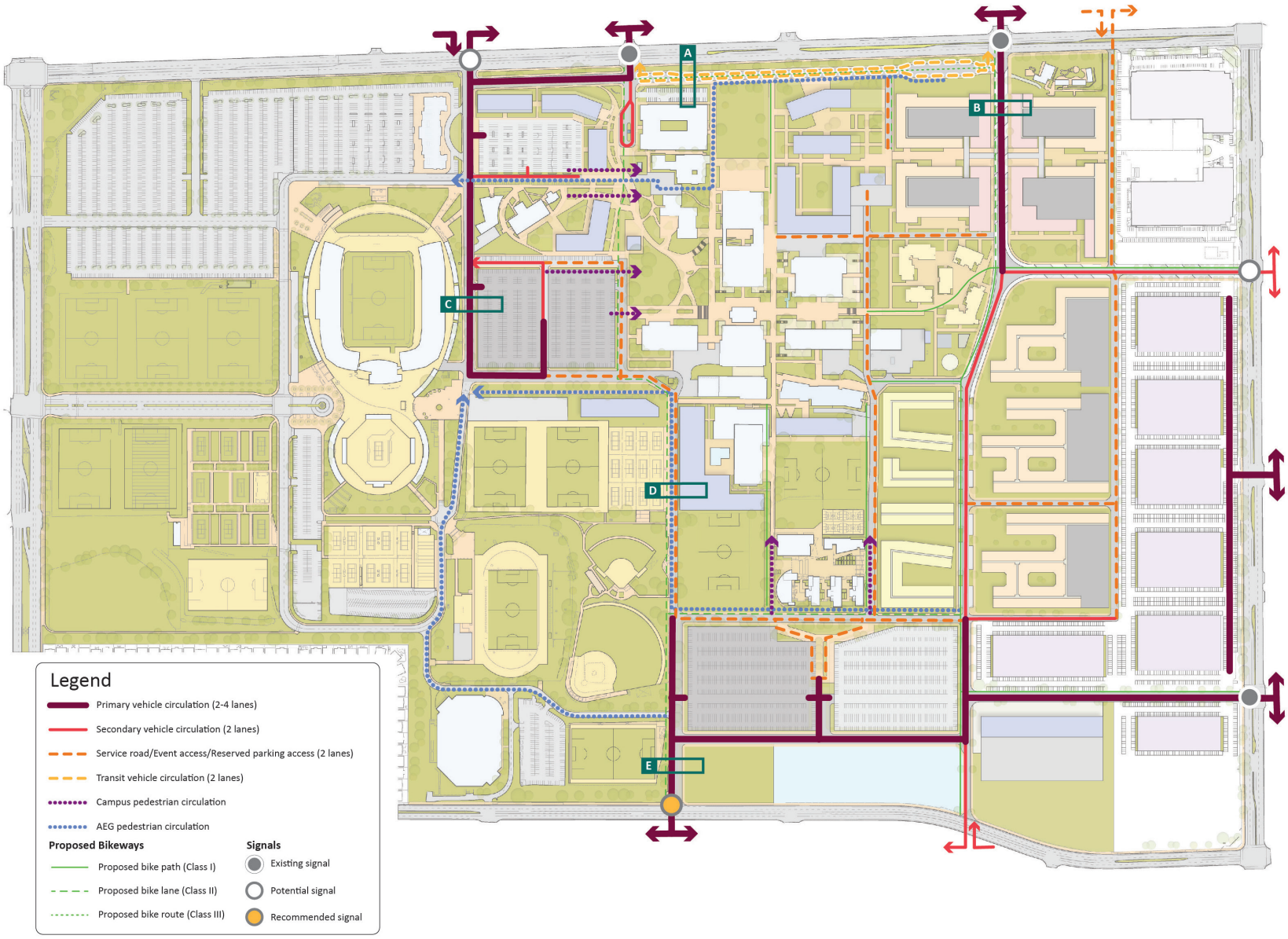
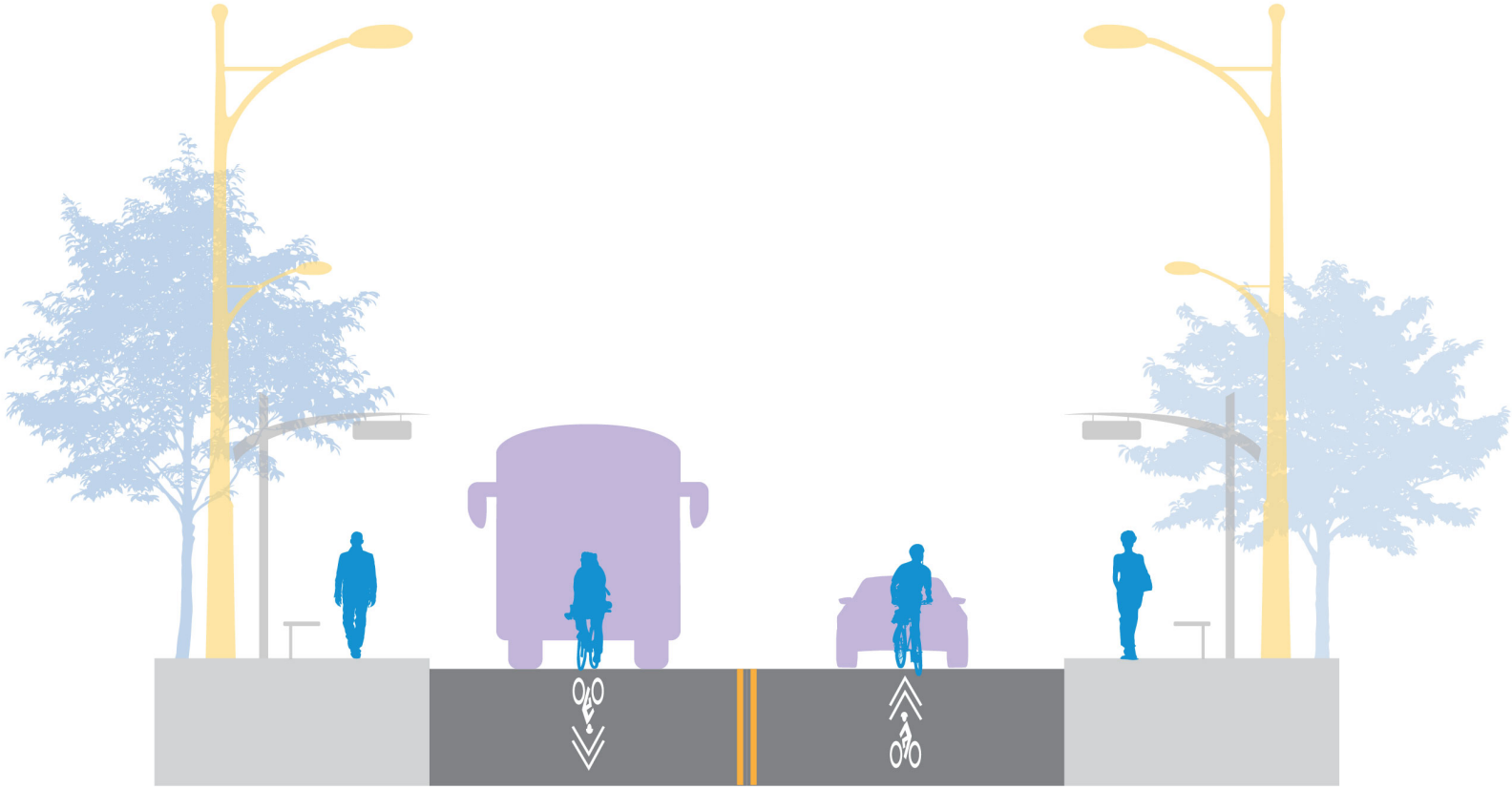


Figure 6

Campus Circulation Map

A

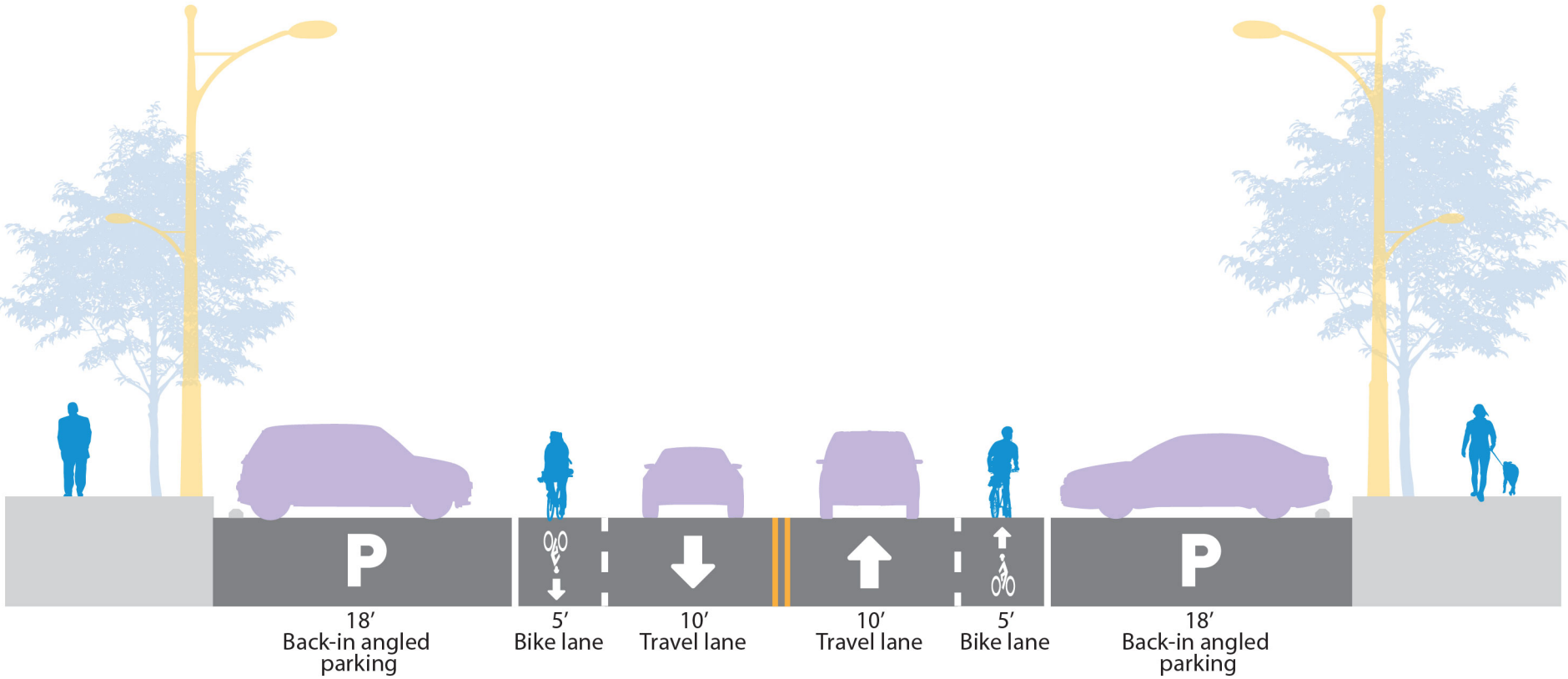


Note: Curbside lane widths include 2′ for curb and gutter.

Figure 7A

Street Section: Shared transit/vehicle lane & bike route - Dominguez Hills Parkway Frontage Road (Parallel to Victoria Street)

B

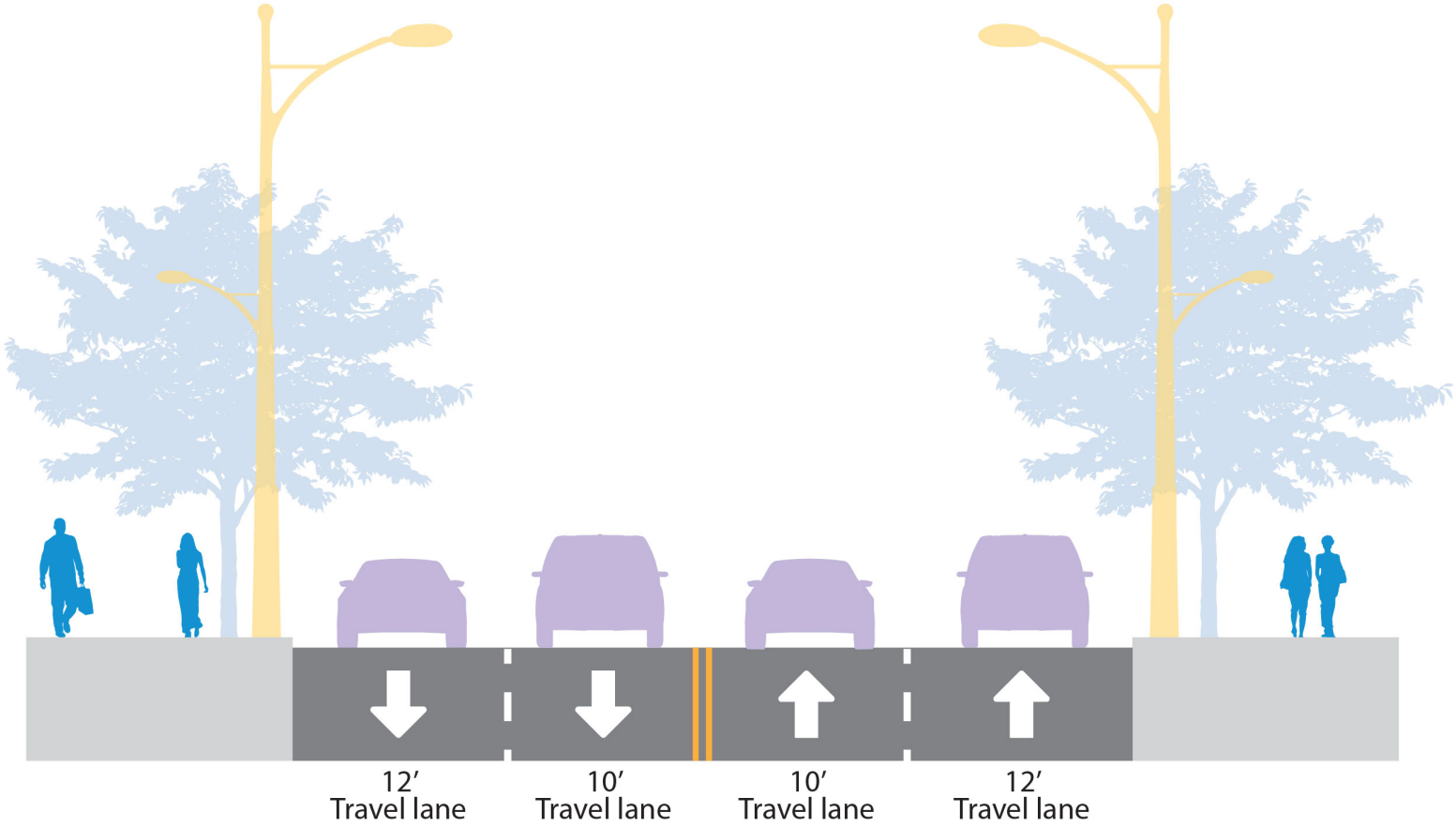


Note: Curbside lane widths include 2' for curb and gutter.

Figure 7B

Street Section: University Village "Main Street" - Birchknoll

C

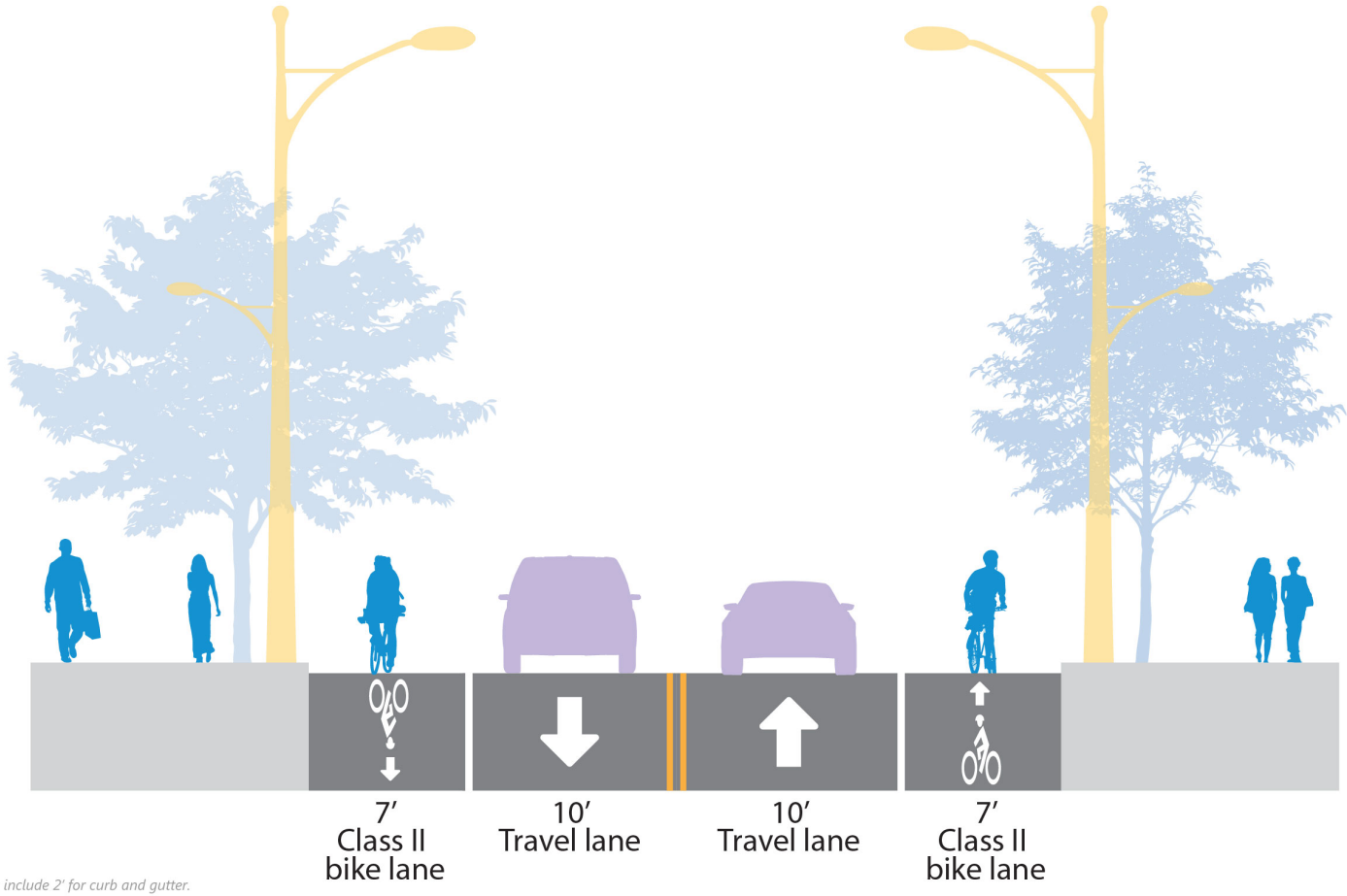


Note: Curbside lane widths include 2' for curb and gutter.

Figure 7C

Street Section: Four travel lanes - Dominguez Hills Parkway West

D

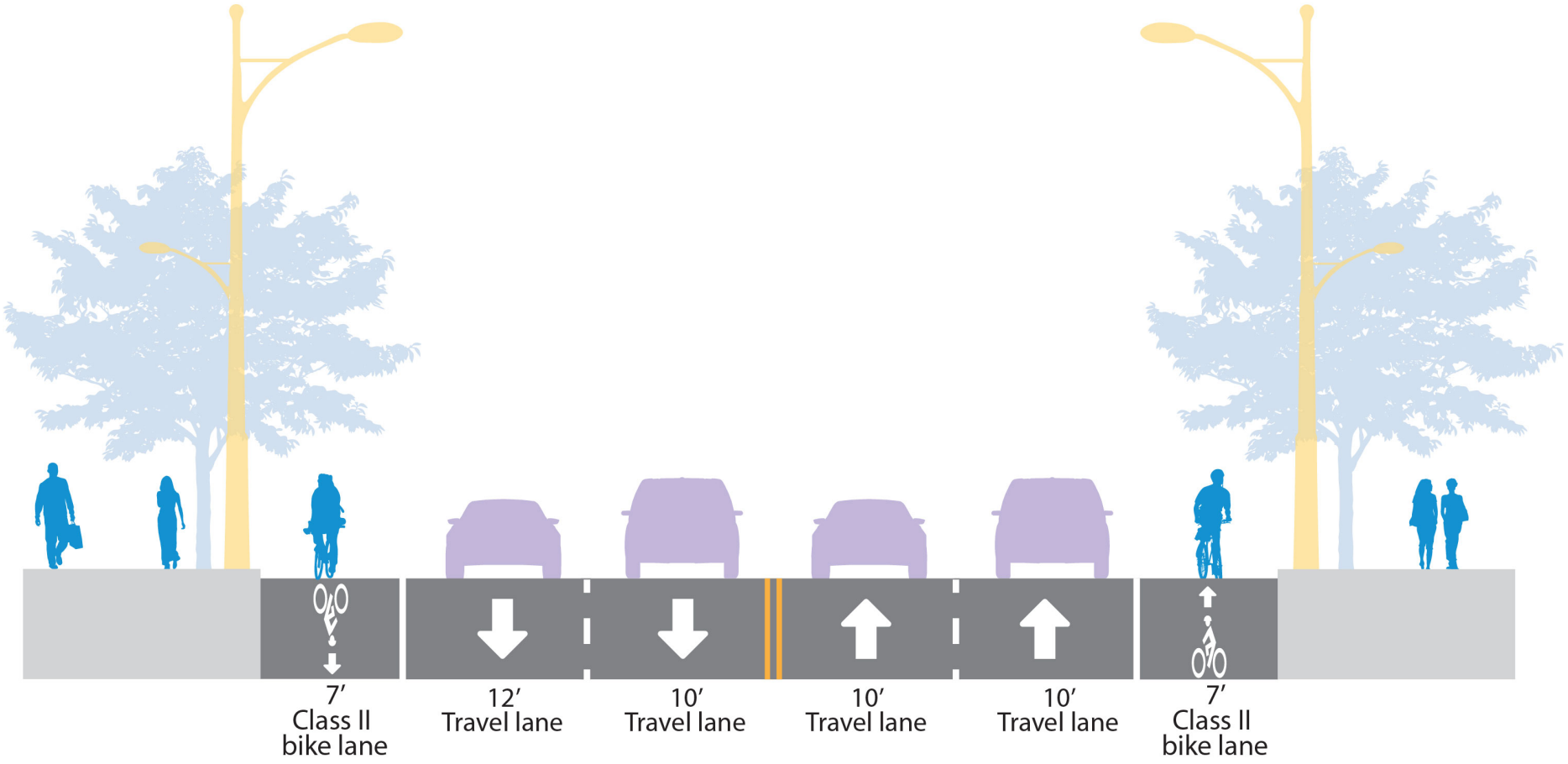


Note: Curbside lane widths include 2′ for curb and gutter.

Figure 7D

Street Service: Service vehicle road with bike lanes - Toro Center Drive

E



Note: Curbside lane widths include 2′ for curb and gutter.

Figure 7E

Street Service: Four travel lanes - Toro Center Drive at University Avenue

Source: Google Maps, 2017.

Figure 8
Information Booth at CSU Sacramento

BICYCLE FACILITIES

Figure 9 illustrates typical cross-sections for the four classes of bicycle facilities. Class I Bike Paths are constructed off-street and do not contribute to the curb-to-curb width. Rather, they are often built alongside the sidewalk, or constructed as a mixed-use path that accommodates both pedestrians and bicyclists through delineation of space using paint or different surface treatments.

Class II Bike Lanes have a recommended minimum width of 5', and do contribute to the curb-to-curb width. Buffered bike lanes have a recommended minimum width of 8', with painted/striped buffers that provide additional space between bicyclists and vehicles. In a campus context, with slow-traveling vehicles, it may not be necessary to include buffered bike lanes to provide a safe and comfortable experience for cyclists and drivers.

Class III Bike Routes are recommended only on roads with one lane in each direction, and do not add to the curb-to-curb width. These facilities are marked with "sharrow" stencils and signage, and are appropriate only on low-speed, low-volume roadways because they require cyclists and drivers to share the road.

Class IV Cycle Tracks are a newer addition to the toolbox of bicycle facilities. They have a recommended minimum width of 8', and include vertical separation between vehicles and bicycles. The vertical separation may be bollards, concrete curbs, or planters/landscaping. Class IV facilities are appropriate on high-volume, higher-speed roads where there may not be enough off-street space to construct a Class I Bicycle Path. Like a Class I Path, Class IV facilities may be constructed to support two-way bicycle traffic on the same facility, requiring a minimum of 15' which includes a raised buffer.

More information about the design of bicycle facilities can be found in the NACTO Urban Bikeways Design Guide, available online at http://nacto.org/publication/urban-bikeway-design-guide/.

Figure 6 illustrates the proposed bicycle facilities for the full build-out of the Campus Master Plan. These facilities include two north/south routes through campus, one of which is a separated bicycle path that traverses much of the University Village area. The on-campus bicycle facilities include bicycle paths, bicycle lanes (which may be upgraded to protected or buffered bicycle lanes), and bicycle routes. These facilities will connect to external bike facilities currently planned by the City of Carson, providing safe bicycle connections to nearby residential, employment and transit destinations. Both long- and short-term bicycle parking facilities will also be provided throughout campus. Three of the proposed bicycle facilities are shown in the cross-sections in Figure 7.

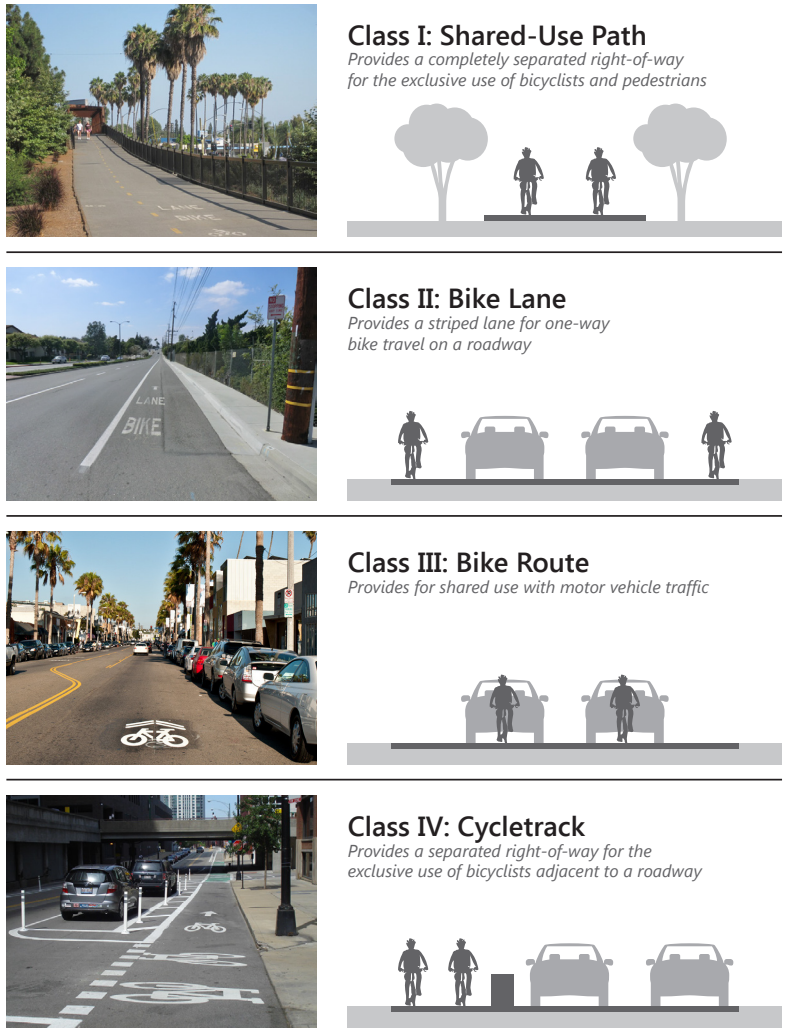


Figure 9
Standard Bicycle Facilities

PEDESTRIAN FACILITIES

On both primary and secondary vehicle routes, the speeds are anticipated to remain slow (<20 miles per hour), to support pedestrian and bicycle safety. On both primary and secondary routes, marked crosswalks should be provided at key pedestrian junctions, including intersections and mid-block locations that experience heavy foot traffic. All crossings should include ADA-compliant curb ramps. Pedestrian-scale wayfinding and lighting should be provided throughout the site, connecting into the campus and linking the development to nearby transit stops.

Pedestrian facilities planned for campus include enhanced pedestrian crossings and a pedestrian plaza facility connecting the western parking structures and lots with the central portion of campus. Enhanced pedestrian facilities, including wide sidewalks and street furniture, will be included as part of the University Village district in the eastern portion of campus.

TRANSPORTATION DEMAND MANAGEMENT

Mode share data for commuters to the CSUDH campus were not available for this study. To develop an understanding of how mode choice and travel patterns may differ on the CSUDH campus compared to other comparable CSU campuses nearby, Fehr & Peers compared daily transit boardings and alightings at the CSUDH campus and analogous on-campus transit facilities at CSU campuses throughout Los Angeles County. As shown in Table 4, CSU Long Beach and CSU Los Angeles experience approximately 10,000 and 5,000 daily boardings and alightings at the stops on or directly adjacent to campus, respectively. CSU Northridge experiences approximately 2,850 daily boardings and alightings at its on-campus transit facility, as well as a bus stop directly adjacent to campus along Nordhoff Street. CSU Northridge ridership is in line with the daily ridership seen at CSU Dominguez Hills, which has far fewer students than Northridge, but approximately 1,000 daily boardings and alightings at the on-campus transit facility and bus stop on Tamcliff at Victoria.

As the Master Plan is implemented, Transportation Demand Management (TDM) strategies should be put in place to further reduce the number of single-occupancy vehicle commute trips to and from campus. A comprehensive TDM plan will assist the campus in meeting state, regional and local goals to reduce vehicle trips and greenhouse gas emissions, including goals laid out in the CSU Systemwide TDM Manual (November 2012). The CSU TDM Manual identifies TDM strategies tailored to the development environment of the CSU system's suburban campuses such as CSUDH, including rideshare matching, parking pricing, and subsidized transit passes. These strategies will complement provisions for enhanced transit, bicycle and pedestrian facilities included in the Master Plan.

Fehr & Peers recommends that CSUDH develop a comprehensive TDM plan and employ a transportation coordinator to implement the plan in order to provide a full suite of transportation options for students, staff and faculty as the campus grows. A robust TDM plan will help to limit the number of additional parking spaces or the additional roadway capacity that will be necessary for vehicle circulation at full buildout of the Master Plan, potentially allowing for more space to be dedicated to academic uses and student amenities.

TABLE 4 DAILY RIDERSHIP ACTIVITY

CSU Campus	Bus Stops	Total Boardings + Alightings	Student FTES
Dominguez Hills	CSUDH Campus, Tamcliff/Victoria	1,047	11,533
Long Beach	W Campus Drive, E Beach Drive	9,768	29,749
Los Angeles	Campus Road, State University Drive, Cal State LA Busway and Metrolink Station	5,297	19,981
Northridge	CSUN Transit Center, Nordhoff Street, Zelzah Avenue	2,851	31,281

Sources: The California State University website 2014-15 student enrollment FTES, LA County Metro, Long Beach Transit, October 2014, via the Metro Active Transportation Strategic Plan.

Note: Daily ridership activity near CSUDH does not account for CSUDH commuters who ride the campus shuttle.

PARKING

The parking necessary to support the land uses in the Master Plan is based on the expressed demand rate on campus found during a November 2016 parking study performed by Fehr & Peers. The study found a peak demand rate of 0.32 spaces per student FTE (not including spaces reserved for on-campus students) and a peak demand rate for on-campus residential spaces of 0.46 spaces per on-campus bed. The proposed number of parking spaces required at full build-out of the Campus Master Plan was developed by applying the current demand rates to the future number of on-campus beds and student FTES, accounting for both a 10% contingency rate, as well as a reduction due to the provision of on-campus housing for faculty and staff. The resulting proposed number of spaces is 7,562, as illustrated in Table 5.

The proposed parking supply rates are in line with parking provision rates for students and faculty found at several other California State University campuses. For comparison, these rates are summarized in Table 6 (on page A-21).

TABLE 5 PROPOSED FUTURE PARKING SUPPLY

	Demand Rate	Unit	Future Buildout FTES / Beds / Dwelling Units	Future Supply
	(A)		(B)	(C)=(A)*(B)
Residential Supply (Dorms)	0.46	per Bed	1,100	506
Residential Supply (Student Apartments)[1]	0.46	per Bed	732	337
Non-Residential Supply[2]	0.35	per Non-Resident Student FTE	18,168	6,359
Staff/Faculty Apartments[3]	2.25	per Dwelling Unit	288	648
Residential Staff/Faculty Discount[4]	-1	per Dwelling Unit	288	(288)
Total				7,562

Source: Fehr & Peers, 2017.

Notes:

1. Assumes three beds per unit.
2. The rate is derived by adding a 10% contingency factor to the 2016 existing demand for parking.
3. Consistent with the City of Carson's parking standards, CSUDH assumes 2 spaces per residential unit larger than a studio, with 1 additional visitor parking space required per 4 dwelling units.
4. Staff/Faculty Discount applied as a reduction of 1 space per 1 dwelling unit, to account for 1 employee per unit who lives and works on campus.

TABLE 6 EXISTING PARKING SUPPLY RATE AT CSU CAMPUSES

Campus	Spaces (14-15)	Student FTES (14-15)	Rate
East Bay	4,271	12,644	0.34
Fullerton	10,347	30,294	0.34
CSUDH Master Plan[1]	*6,954*	*20,000*	*0.35*
Los Angeles	7,557	19,981	0.38
Northridge	11,852	31,281	0.38
Bakersfield	3,552	8,157	0.44
Long Beach	14,016	29,749	0.47

Source: The California State University website 2014-15 FTE enrollment and 2014-15 parking spaces. Rate calculated as parking spaces per student FTE.

1. Proposed number of spaces and supply rate for full buildout of Campus Master Plan.

TRANSIT HUB

The transit hub on the frontage road along the north edge of campus is necessary to support the various transit services and the campus shuttle. The frontage road between Birchknoll Drive and Tamcliff Avenue is envisioned as a transit- and bike-only facility. Pavement markings and signage should be installed to communicate the passenger vehicle restriction along this segment of the frontage road. Travel lanes should be 12 feet wide to accommodate transit vehicles, and wide bus pull-outs will accommodate both eastbound and westbound buses, allowing for improved direct transit connections on campus. Sharrows and bicycle route signage should be installed along this segment of the frontage road to indicate that the roadway is a shared bus and bike facility.

The specific design, sizing, and additional amenities offered at the transit hub should be determined closer to implementation, to match the specific transit services that are offered at that point and the needs of the transit riders and vehicle operators. These amenities often include seating, trash receptacles, bathrooms, shade structures, landscaping, and transit signage (including real-time arrival information). To support the development and visioning of the transit hub, two examples of recent campus transit hubs are provided in Figure 10.

CSU Los Angeles, Source: Google Maps, 2017.

CSU San Bernardino, Source: Google Maps, 2017.

Figure 10
CSU Campus Transit Facilities

B.2: Utilities Engineering

The **University Village** is an urban design concept within the CSUDH 2018 Master Plan that integrates the academic core and the student residential community with a neighborhood of retail and business communities and campus apartment housing to create a live/work/play environment with synergistic connections to the University's mission and purpose. Unless otherwise noted, the Design Guidelines analyses and reports appearing in this Appendix address all the parcels of the University Village.

CAMPUS CHW SYSTEM

CHILLED WATER INFRASTRUCTURE HIGHLIGHTS

PART-A: CORE CAMPUS

Core Area: 1.8 million GSF

Long Term Cooling Capacity: 4,300 Tons

Strategy: Expand central plant to 3,000 Tons; Add 24,000 Ton Hr. TES

Provide Two Satellite Plants, with combined capacity of 1,300 Tons (One at Northwest, One for housing or southern segment)

CORE CAMPUS BUILDINGS LIST

A	Academic
B	Academic
C	Black Box Theatre
D	Academic
E	Rec Center
F	Student Apartments
I	Academic
J	Academic
K	Academic
L	Student Union Expansion
M	Academic
N	Academic
O	Academic
P	Central Plant Expansion
Q	Satellite Central Plant

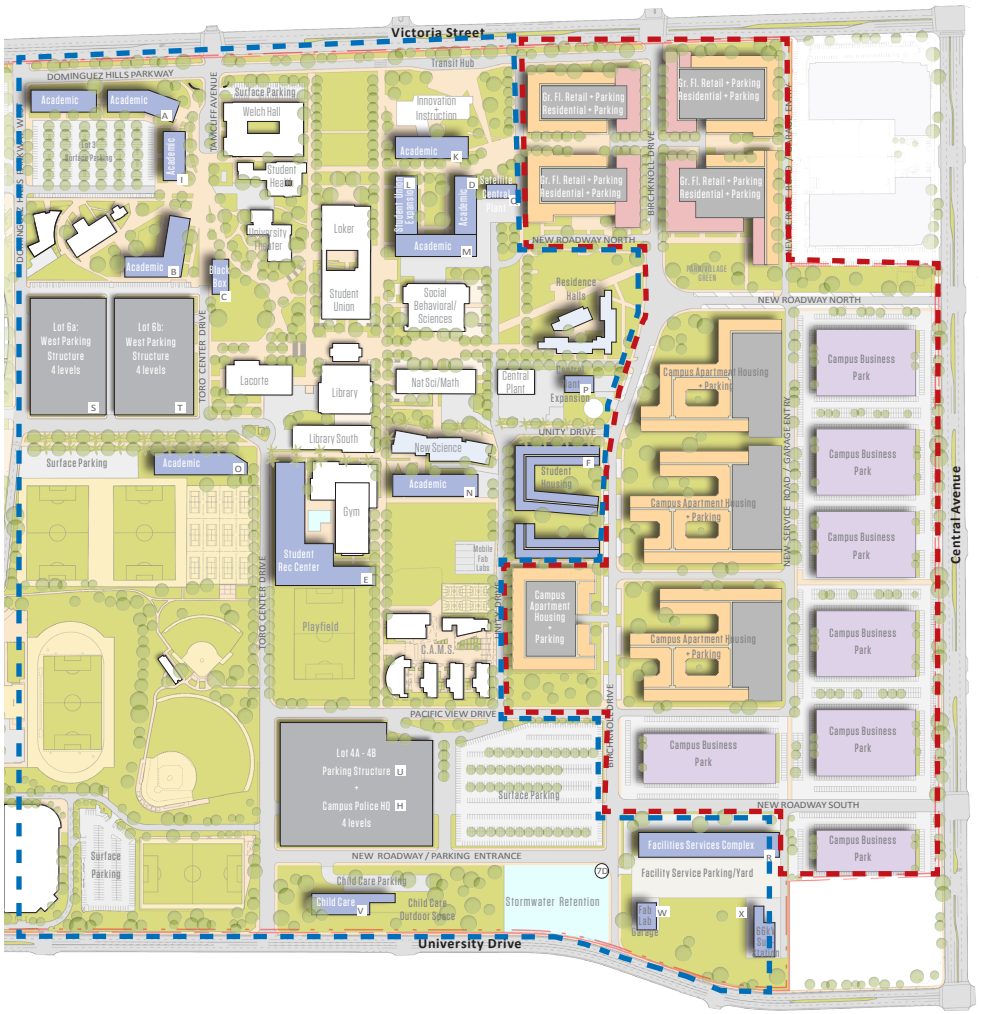


FIGURE 1. HIGHLIGHTS OF CAMPUS MASTER PLAN COOLING INFRASTRUCTURE

PLAN NORTH

LEGEND

- – – – CORE CAMPUS
- – – – UNIVERSITY VILLAGE AREA

R	Facilities Services Complex
V	Child Care
W	Fab Lab Garage
*	Residence Halls and New Science Bld

New Science Building

PART-B: UNIVERSITY VILLAGE [UV]

UV Parking Area: 1.9 million GSF
UV Building Area: 3.3 million GSF

Cooling Tons: 4,850 TONS

Strategy: Satellite Plants or In-building chillers. If Satellite Plants, possibly 3-Total, One for North, Core and South as development occurs

UNIVERSITY VILLAGE - PROPOSED DEVELOPMENT

- Campus Apartment Housing
- Campus Business Park
- Retail

PART A: CAMPUS COOLING INFRASTRUCTURE

A. EXISTING SYSTEMS

The campus central plant has currently two, 1,000 Ton gas fired absorbers that provide cooling to most of the core campus buildings that total approximately 1 million GSF (See Table 1 and Figure 1). Historical observation is that the actual current load is of the order of 1,550 Tons or roughly 600 GSF/Ton.

The campus chilled water distribution system consists of a non-loop system, with a 24" diameter supply header at the central plant. The plant deploys two distribution pumps, each rated at 2,500 GPM to distribute chilled water to the core campus buildings. Generally, under present load conditions, only one pump operates at any time. A single pump, can deliver nearly 1,666 Tons when the chilled water supply and return temperature differential is 16 deg. F. A vast majority of the chilled water steel piping system is in tunnels whereas some of the branch piping to remote parts of the distribution system is in direct buried steel pipes.

The existing plant building includes a 15 MMBtuh boiler as well as all hot water heating pumps, chilled water primary and secondary pumps, and the operator control room, electrical switchgear room, and small administrative offices. There is no room inside the existing plant building to add additional chillers (See Figure 3). The cooling towers and condenser pumps are situated to the east of the existing central plant, within the same overall central plant yard.

Bldg. ID	Building Name	GSF	CHW Tons Served	To Remain/To Be Deleted
2	(SCC-2) SMALL College Complex 2	5,313.00	8.86	Deleted
5	(SCC-5) SMALL College Complex 5	5,315.00	8.86	Deleted
6	(SCC-6) SMALL College Complex 6	5,841.00	9.74	Deleted
7	(SCC-7) SMALL College Complex 7	2,145.00	3.58	Deleted
8	(SCC-8) SMALL College Complex 8	2,920.00	4.87	Deleted
10	(SCC-10) SMALL College Complex 10	2,145.00	3.58	Deleted
11	(SCC-11) SMALL College Complex 11	5,841.00	9.74	Deleted
14	(COE) School of Education	26,433.00	44.06	Deleted
20	(LIB) Leo F. Cain Library	152,006.00	253.34	Remains
20A	(LIB) Library Addition	139,569.00	232.62	Remains
23	(WH) James L. Welch Hall	179,952.00	299.92	Remains
25	(SHC) Student Health Center	20,046.00	33.41	Remains
26	(LSU) Loker Student Union	123,033.00	205.06	Remains
30	(SBS) Social and Behavorial Sciences	81,000.00	135.00	Remains
40	(LCH) Lacorte Hall	70,331.00	117.22	Remains
45	(UT) University Theatre	25,201.00	42.00	Remains
50	(NSM) Natural Sciences and Math	84,450.00	140.75	Remains
Total (Existing Buildings)		**931,541.00**	**1,552.57**	
Total (Existing Buildings) - To Remain		**875,588.00**	**1,459.31**	

TABLE 1. EXISTING BUILDINGS SERVED BY CHW PIPING

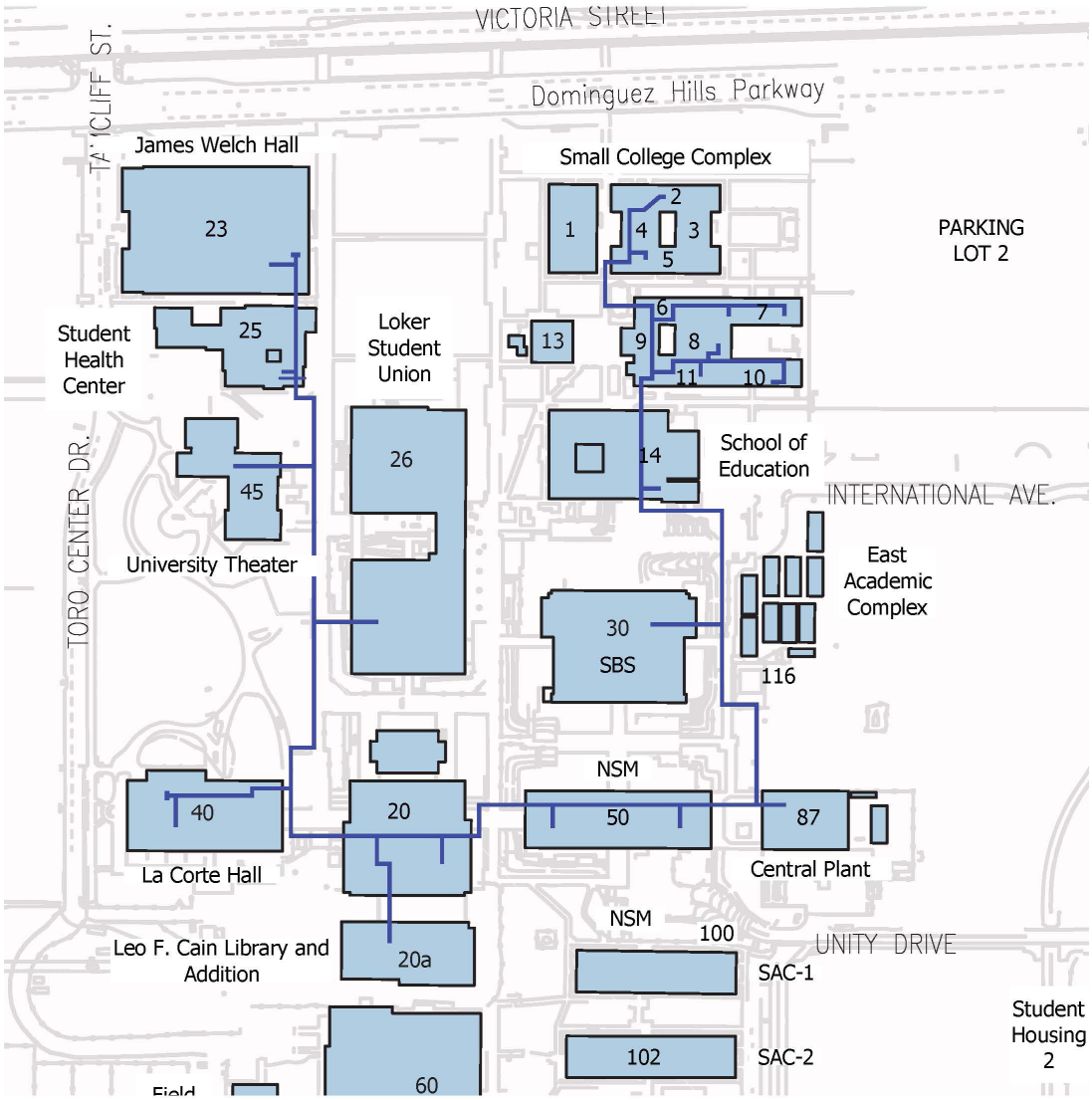


FIGURE 2. EXISTING CHW SYSTEM

B. SYSTEM CHANGES UNDERWAY (JULY 2017)

A cooling tower replacement project is underway to replace the existing cooling towers that have deteriorated beyond repair. Once these new towers are in place, the towers can provide cooling capacity for 3,000 Tons through high efficiency electric chillers. The cooling tower structure that is being built can accommodate one more tower cell, bringing the total tower capacity to 4,000 Tons as future loads increase.

Since the existing chillers have also nearly reached the end of their useful life and there is a strong desire on part of the campus to reduce the GHG foot print through the use of high efficiency electric chillers, there is a strong likelihood that the existing absorption chillers will be replaced over the next three years. There are currently plans under way to build the first of the three 1,000 Ton electric chillers to help the central plant meet the additional loads associated with the new Science building which is in design and which is expected to demand approximately 140 Tons. The 1000-Ton chiller would work in concert with the existing absorption chillers until there is funding available for replacing both the old absorption chillers with new electric chillers. The plant yard area which is south east of the existing plant building has been targeted as the potential spot for a new cooling system consisting of one or more electric chillers.

C. LOAD GROWTH ASSOCIATED WITH MASTER PLAN

Table 2 summarizes the potential buildings being considered for development as part of the Master Plan. Table 2 shows the area for the Core campus which is within reasonable reach of the existing central plant

Based on addition of about 1.8 million GSF of buildings per Table 2 (net of any buildings that would be replaced), the long term cooling loads that need to be met by the campus cooling infrastructure is estimated at 4,300 Tons. This is based on a diversified load index of 600 GSF/Ton for academic buildings and 750 GSF/Ton for the housing complex, which is comparable to observed diversified cooling intensity based on existing building systems.

Building ID	Building Name	GSF
A	Academic	158,572
B	Administration	131,800
C	Black Box Theatre	7,640
D	Academic	68,000
E	Rec Center	148,400
F	Apartments	414,403
I	Incubator	57,128
J	Academic	136,050
K	Academic/Admin	105,850
L	Student Union Expansion	85,000
M	Academic/Admin	94,360
N	Academic/Admin	116,250
O	Academic/Admin	104,020
	Residence Hall	90,000
	New Science Building	85,000
Total:		**1,802,473**

TABLE 2. CORE CAMPUS - POTENTIAL BUILDINGS

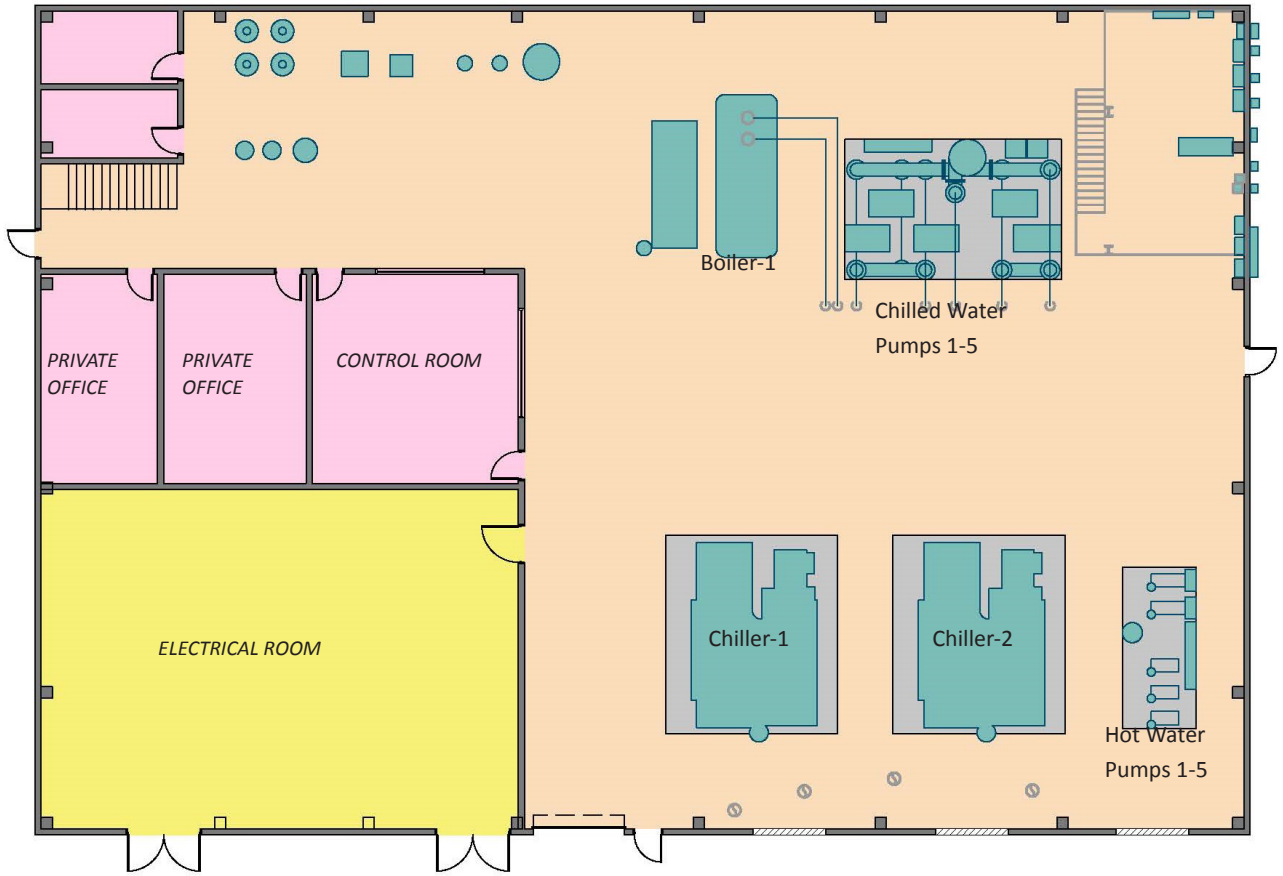
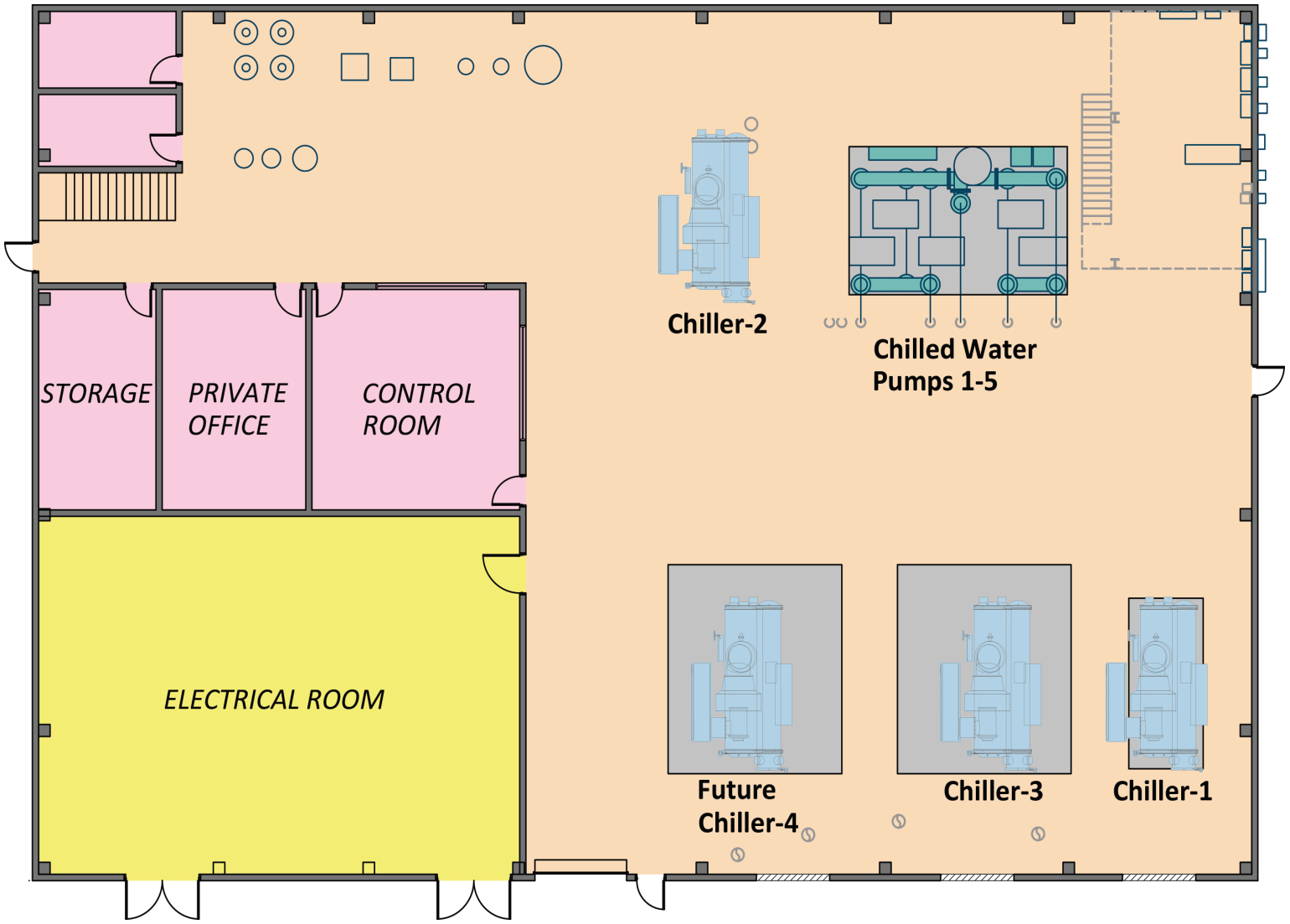


FIGURE 3. EXISTING CENTRAL PLANT LAYOUT


STORAGE
PRIVATE OFFICE
CONTROL ROOM
ELECTRICAL ROOM
Chiller-2
Chilled Water Pumps 1-5
Future Chiller-4
Chiller-3
Chiller-1

D. MEETING LONG TERM COOLING LOADS WITHIN THE CORE CAMPUS

Assuming that the campus secures funding for the conversion of the central plant from the present absorption based cooling system to the electric cooling system, here is one potential scenario for accommodating the 4,300 Tons of long term cooling demand.

1. Provide a new electric chiller plant building inside the existing plant yard (Figure 3). This electric chiller plant building will have eventually Four, 1,000Ton high efficiency electric chillers. FOUR of these make up a total capacity of 3,000 Tons and one of the chillers will be a redundant chiller.

2. The existing chilled water primary pumps would become obsolete as new electric chillers and associated new primary pumps are installed. In their place, an additional chilled water distribution pump of comparable capacity (e.g., 2,500 GPM, 150 ft. head) would be added to provide the needed redundancy in chilled water distribution capacity.

3. An additional cooling tower cell would be added to bring the total cooling tower capacity to 3,200 Tons of electric chillers.

4. An additional condenser water pump would be added to provide required redundancy as the electric chiller plant is fully built out

5. To help avoid high demand charges associated with the electric chiller plant, add a Thermal Energy Storage Chilled water tank that is approximately 60 ft.in diameter and 96 ft. tall, to provide up to 24,000 Ton Hours of cooling. Such a tank would therefore provide approximately 4,000 Tons of cooling for 6-hours.

6. The existing absorption chillers in the central plant would be removed. Space cleared would be used for providing any needed space for additional boilers required for meeting future heating loads.

7. As campus needs an additional 1,300 Tons of capacity (to reach up to the 4,300 Tons stated in paragraph C. above), consider satellite plant(s) that are interconnected to the central chilled water distribution piping. Figure 5 shows possible locations of satellite plants. Options include a Satellite Plant for the housing area (SP1), a satellite plant for the North west portion development of the core campus (SP2), and a possible location (SP3) in vicinity of the proposed Recreation center building. Any two of these satellite plant locations could be used to provide the needed incremental capacity of approximately 1,300 Tons.

8. Typically, the satellite plants could consist of either air cooled chillers (for example, 2, 325 Ton air cooled chiller at each satellite plant location) or water cooled chillers and a cooling tower at each location. Choice of actual configuration would be developed based on noise, space availability, etc. at each applicable location. The satellite plant with a capacity of 600 Tons would need an approximate footprint of 30' x 50'.

9. Also shown in Figure 5 are piping upgrades required to distribute chilled water to the core campus buildings.

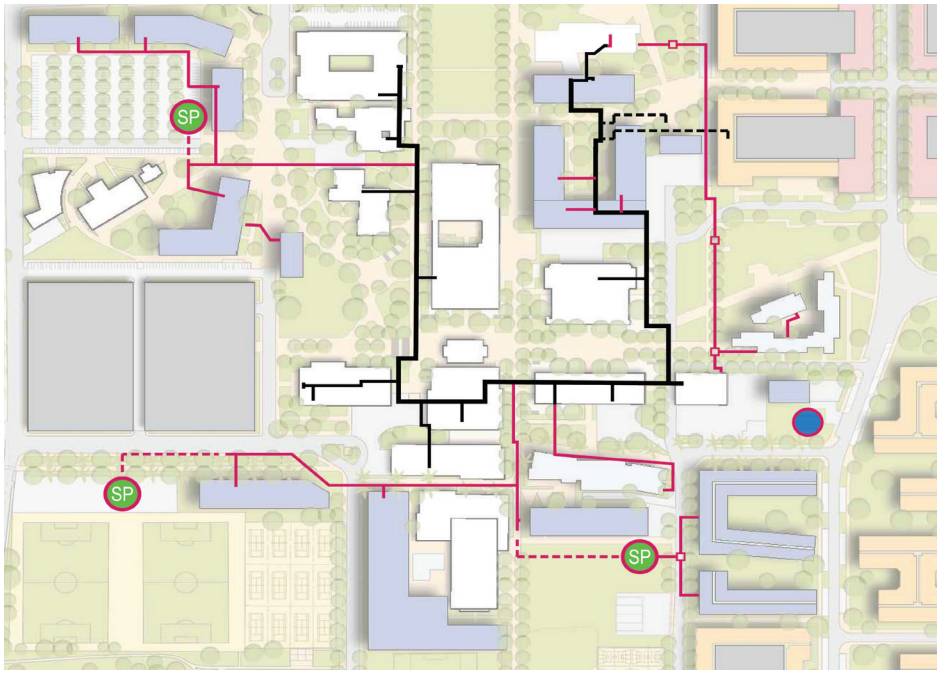


FIGURE 5. NEW CHW DISTRIBUTION AND POSSIBLE SP LOCATIONS

PART B: UNIVERSITY VILLAGE AREA COOLING INFRASTRUCTURE

A. LOAD GROWTH ASSOCIATED WITH MASTER PLAN

Table 3 summarizes the potential private/public partnership buildings being considered for development as part of the Master Plan in the University Village area. The types of development include 1.9 million GSF of parking structures, 2.6 million GSF of multi-family residential units, 96,085 GSF of retail areas and 572,400 GSF of campus business park buildings. Figure 6 shows the University Village buildings. The combined long term cooling loads associated with this development is estimated at approximately 4,850 Tons.

B. MEETING LONG TERM COOLING LOADS WITHIN THE UV AREA

Since there is very little certainty on how and when these buildings will be developed through private investment, it would be difficult for a prospective developer to sink in funds for developing a single central plant and chilled water distribution system that would be capable of handling the entire long term loads expected in the University Village area. Distributing up to 4,850 Tons could entail a 22" pipe at the central plant. Depending on how these buildings are phased, it is conceivable that three different central plants or satellite plants could be developed. For instance, the entire region can be grouped into three zones (North, Center and South) or grouped by type of buildings that would be developed. When the plant capacity is only 2,000 Tons for instance for a localized plant, the pipe size requirement for distribution reduces to 14".

A more realistic possibility is that each building could be developed on its own, with an in-building chiller that is capable of being tied to a potential common loop that would serve future adjacent buildings within that zone. This strategy provides the opportunity for a prospective building developers to have minimal overheads associated with the initial development cost. Flexibility would be retained to tie the chiller(s) in any building to chiller(s) in the next building that would be developed. Pathways for chilled water piping connecting the buildings could be left clear for the construction of future piping connections. The mechanical rooms and chiller rooms would be strategically situated in each building so that the overheads associated with future piping interconnections are minimized.

The upside of the distributed chiller concept is that risk for a developer would be minimized since substantial investment with cooling infrastructure would not burden any single building. The downside is that long term maintenance cost would be greater in comparison with a central chiller plant.

Either the distributed chiller option of the central plant(s) option can be designed with thermal energy storage as a component in the overall design. The type of thermal storage system that would be cost effective would vary and the pumping schemes would vary depending on which of the cooling infrastructure option is pursued.

	Parking	Multi-Family	Retail	Apartments	Business Park and Misc	Total
GSF	1,853,040	2,560,642	96,085	-	572,400	5,082,167
GSF/Ton (Load)	-	750	350	750	500	
Tons	**-**	**3,414**	**275**	**-**	**1,145**	**4,834**

TABLE 3. UNIVERSITY VILLAGE AREA COOLING LOAD ESTIMATES

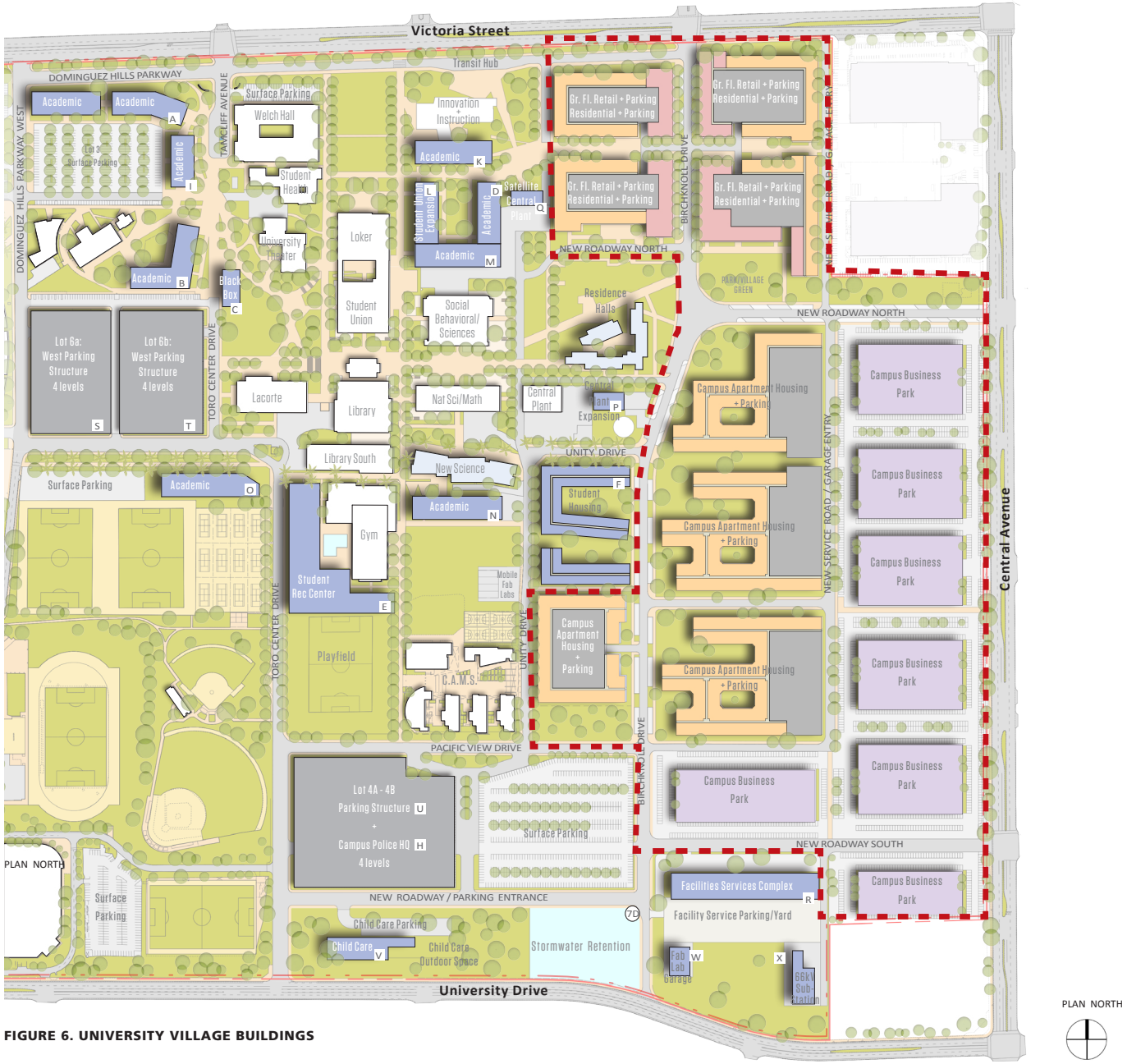


FIGURE 6. UNIVERSITY VILLAGE BUILDINGS

CAMPUS HHW SYSTEM

HOT WATER INFRASTRUCTURE HIGHLIGHTS

PART-A: CORE CAMPUS

Core Area: 1.8 million GSF

Long Term Central Heating: 15 MMB-TUH

Future Distributed In-Building Boiler Capacity: 37 MMBTUH

Strategy: Do not expand the central heating distribution system. Provide all future buildings with in-buildings boilers.

CORE CAMPUS BUILDINGS LIST

A	Academic
B	Academic
C	Black Box Theatre
D	Academic
E	Rec Center
F	Student Apartments
I	Academic
J	Academic
K	Academic
L	Student Union Expansion
M	Academic
N	Academic
O	Academic
P	Central Plant Expansion
Q	Satellite Central Plant
R	Facilities Services Complex
V	Child Care
W	Fab Lab Garage
*	Residence Halls & New Science Bld.

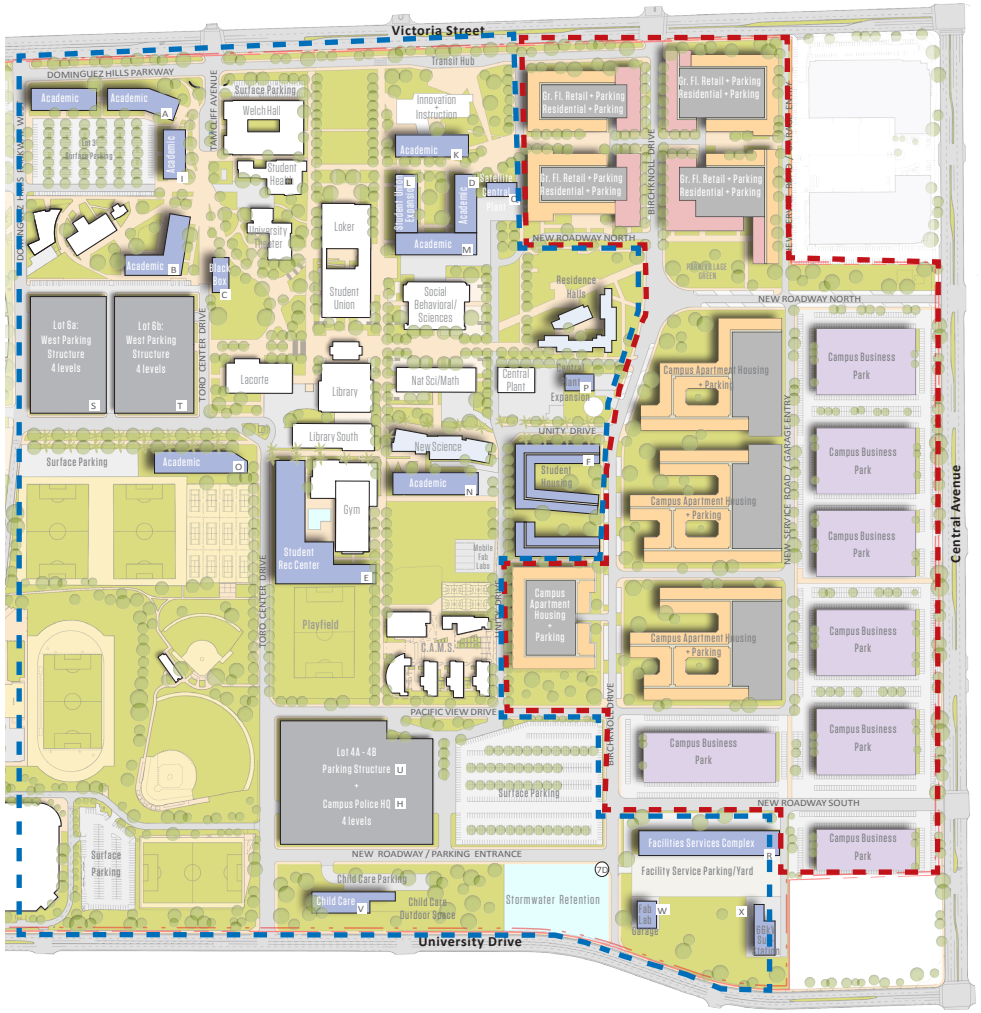


FIGURE 1. HIGHLIGHTS OF CAMPUS MASTER PLAN HEATING INFRASTRUCTURE

LEGEND

- CORE CAMPUS
- UNIVERSITY VILLAGE AREA

PLAN NORTH

PART-B: UNIVERSITY VILLAGE [UV]

UV Parking Area: 1.9 million GSF
UV Building Area: 3.3 million GSF

Heating Capacity: 77 MMBTUH

Strategy: Provide in-building boilers for all buildings under University Village.

UNIVERSITY VILLAGE - PROPOSED DEVELOPMENT

- Campus Apartment Housing
- Campus Business Park
- Retail

PART A: CORE CAMPUS HEATING INFRASTRUCTURE

A. EXISTING SYSTEMS

The campus central plant has currently one, 12 MMBtuh output gas fired boiler for providing central hot water heating to approximately 941,340 GSF of core campus buildings (See Table-1). In addition, each of the two absorption chillers have the capability to provide an estimated 12 MMBtuh of heat, if called upon to supplement the boiler heating capacity.

The campus hot water distribution system consists of a non-loop system, with a 10" diameter supply header at the central plant (See Figure 1). The plant deploys two distribution pumps, each rated at 1,000 GPM to distribute hot water at around 180 deg. F to the core campus buildings. Generally, under present load conditions, only one pump operates at any time and one remains as a standby pump. Based on campus heating season experience, the heating demand has rarely been greater than 12 MMBtuh. It appears that the original intent was that the hot water heating system would operate at a temperature differential of 60 deg. F. However, during a majority of the time, the hot water temperature differential between supply and return remains under 30 deg. F. Therefore, the realistic maximum heating capacity of the existing infrastructure at the 1,000 GPM pumping rate of the secondary hot water pump is approximately 15 MMBtuh.

B. SYSTEM CHANGES UNDERWAY (JULY 2017)

The new Science center building will be connected to the existing heating hot water system. It is expected that with this building added to the loop, the heating load would jump to an estimated 15 MMBtuh. Currently, the combination of existing boiler and the absorption chiller-heaters can carry the load. However, if these absorption chillers were to be removed from service, campus will need to provide new small boilers to meet the peak heating load of 15 MMBtu for the existing loop, with the Science building added.

Bld. ID	Building Name	GSF	HHW MBH Served	To Remain/To Be Deleted
20	(LIB) LEO F. CAIN LIBRARY	152,006	3,480	Remains
20A	(LIB) LIBRARY ADDITION	139,569	1,057	Remains
23	(WH) JAMES L. WELCH HALL	179,952	3,547	Remains
25	(SHC) STUDENT HEALTH CENTER	20,046	790	Remains
26	(LSU) LOKER STUDENT UNION	123,033	7,347	Remains
30	(SBS) SOCIAL AND BEHAVIORAL SCIENCES	81,000	2,194	Remains
40	(LCH) LACORTE HALL	70,331	3,193	Remains
45	(UT) UNIVERSITY THEATRE	25,201	1,194	Remains
50	(NSM) NATURAL SCIENCES AND MATH	84,450	3,949	Remains
60	(GYM) GYMNASIUM	65,752	10,335	Remains
TOTAL		941,340		

TABLE 1. EXISTING BUILDINGS SERVED BY HHW PIPING

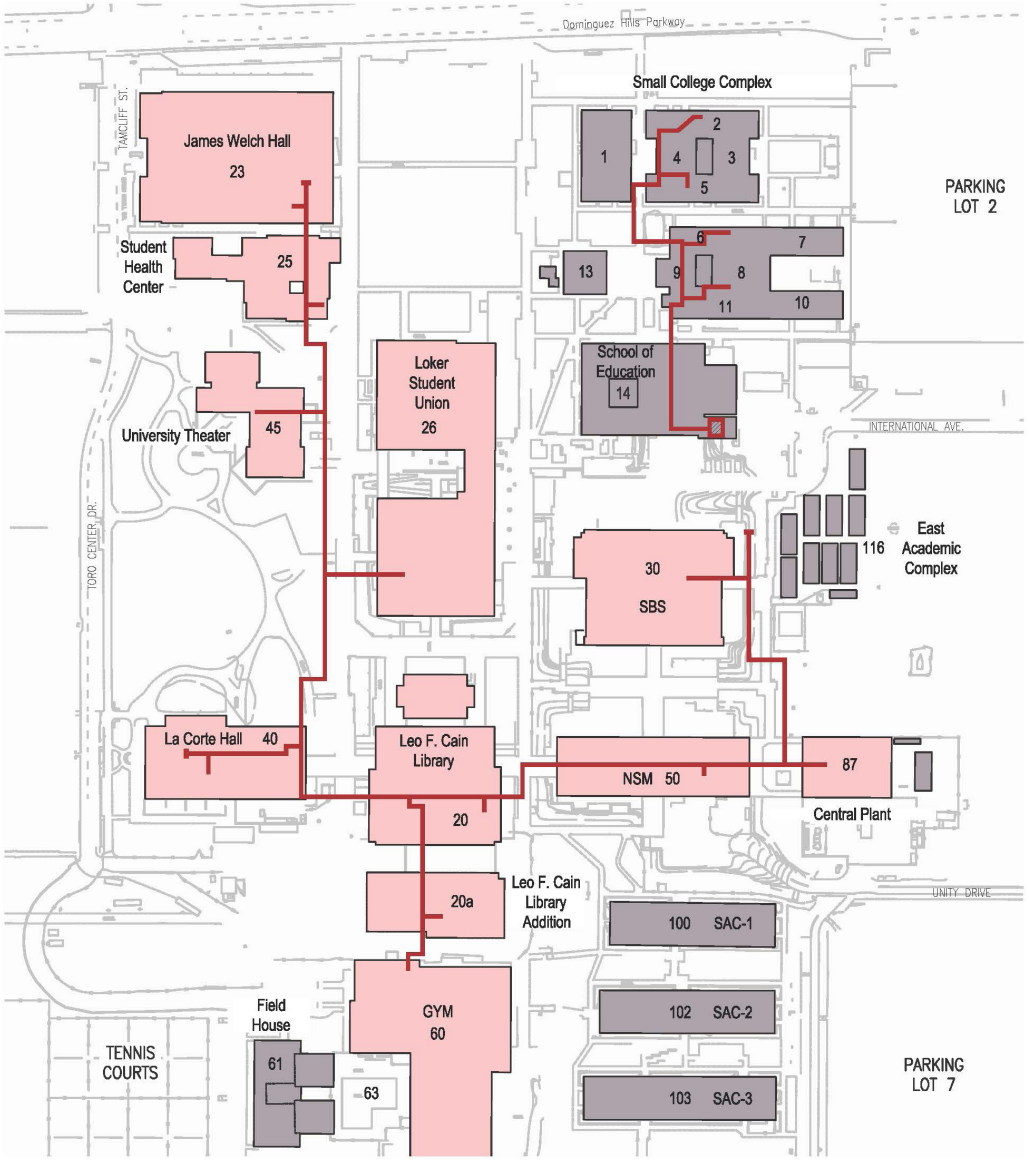


FIGURE 2. EXISTING HHW PIPING

C. LOAD GROWTH ASSOCIATED WITH MASTER PLAN

Table 2 summarizes the potential core campus buildings being considered for development as part of the Master Plan. The listed core campus area buildings are within reasonable reach of the existing central plant.

Based on addition of about 1.8 million GSF of buildings per Table 2 in the core campus, the long term additional heating loads that need to be met by the campus heating infrastructure is estimated at 39 MMBtuh. Of this, the housing complex is expected to be approximately 13 MMBtu and the rest of the new core campus buildings would be approximately 26 MMBtuh. For planning purposes, these estimates use a heating index of 25 Btuh/SFT for housing and 20 Btuh/SFT for rest of the new buildings. The higher index for housing is to accommodate the higher domestic hot water needs due to shower water and dining facility needs.

D. MEETING LONG TERM HEATING LOADS WITHIN THE CORE CAMPUS

Since hot water heating systems entail much more thermal losses in comparison with chilled water distribution systems (primarily due to large temperature differential between ambient and fluid temperature), it would be prudent for the campus to consider a more distributed form of heating system over the long term for planning purposes. With the availability of more efficient condensing boilers that operate at 90% plus efficiency as opposed to the present 75-80% efficiency of central boilers, locating heating capacity in future buildings right within the building helps eliminate distribution losses associated with direct buried piping. Numerous institutions have continually experienced losses and leaks in direct buried hot water distribution system piping and the distributed boiler strategy will also assist in reducing long term maintenance costs associated with hot water piping infrastructure.

Based on the above, this plan does not recommend making significant expansion efforts on the central heating system infrastructure. However, to make the existing system(s) more efficient, the following long term changes are recommended.

1. Replace the existing large 12 MMBtuh boiler with smaller modular boilers, with condensing capability that could be used at least during low load periods.

2. As the old chillers are removed and new electric chillers are provided, provide an additional capacity in heating for achieving a minimum level of redundancy. The long term configuration could consist of eight, 2 MMBtu (input) boilers. This will handle existing core campus loads and the proposed new Science building.

3. All new core area buildings would have their own boilers. The combined installed capacity of these boilers is expected to be approximately 37 MMBtuh.

Figure 3 shows the scheme for locating modular. condensing boilers within the existing central plant. Figure 4. shows the new hot water piping schematic to the new science center building.

Building ID	Building Name	GSF
A	Academic	158,572
B	Administration	131,800
C	Black Box Theatre	7,640
D	Academic	68,000
E	Rec Center	148,400
F	Apartments	414,403
I	Incubator	57,128
J	Academic	136,050
K	Academic/Admin	105,850
L	Student Union Expansion	85,000
M	Academic/Admin	94,360
N	Academic/Admin	116,250
O	Academic/Admin	104,020
	Residence Hall	90,000
	New Science Building	85,000
Total:		**1,802,473**

TABLE 2. CORE CAMPUS - POTENTIAL BUILDINGS

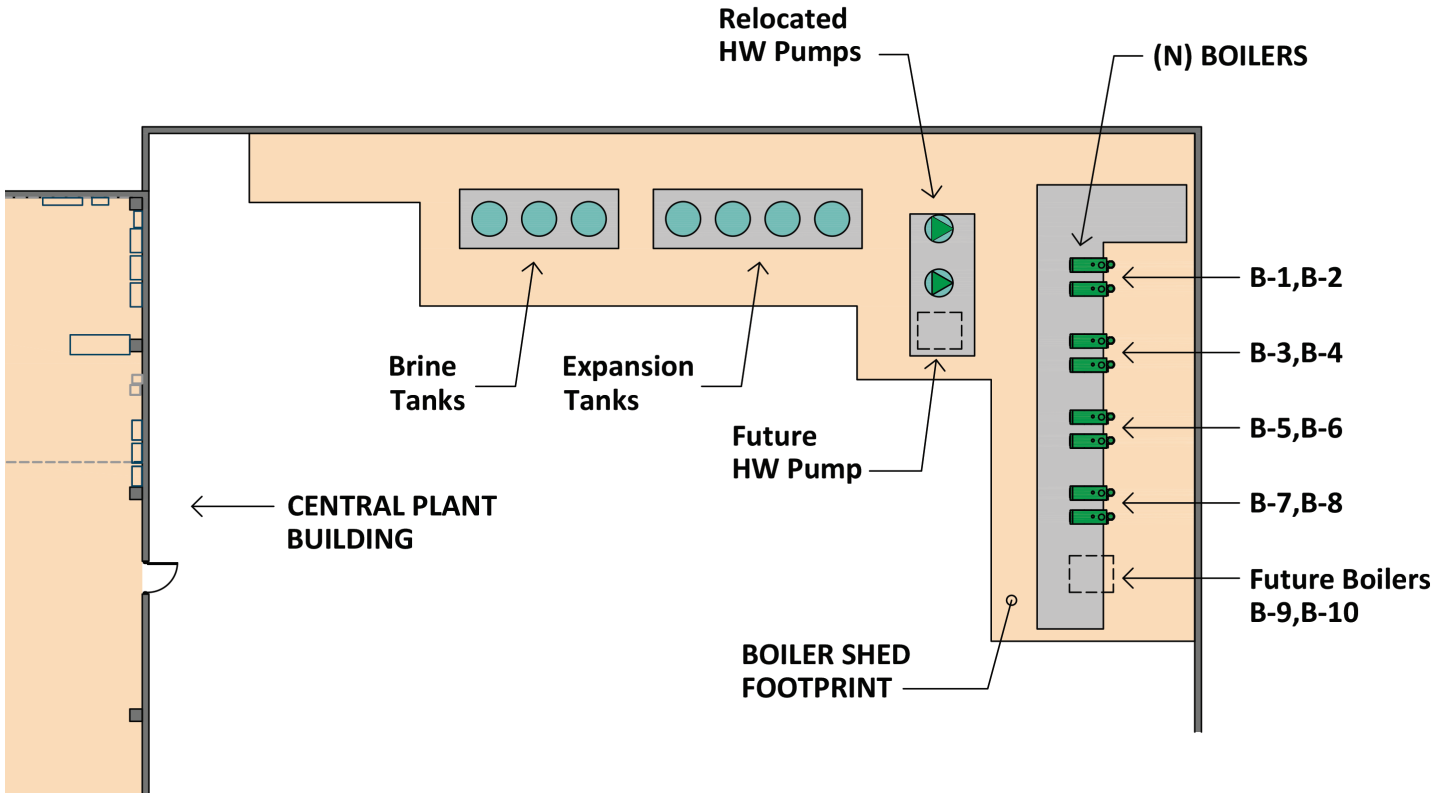


FIGURE 3. BOILER LAYOUT AT CENTRAL PLANT

PART B: UNIVERSITY VILLAGE AREA HEATING INFRASTRUCTURE

A. LOAD GROWTH ASSOCIATED WITH MASTER PLAN

Table 3 summarizes the potential private/public partnership buildings being considered for development as part of the Master Plan in the University Village area. The types of development include 1.9 million GSF of parking structures, 2.6 million GSF of multi-family residential units, 96,085 GSF of retail areas, and 572,400 GSF of campus business park buildings. Figure 5 shows the University Village buildings. The combined long term heating loads associated with this development is estimated at approximately 77 MMBtuh.

B. MEETING LONG TERM HEATING LOADS WITHIN THE UV AREA

Since there is very little certainty on how and when these buildings will be developed through private investment, it would be difficult for a prospective developer to sink in funds for developing a single central plant and hot water distribution system that would be capable of handling the entire long term loads expected in the University Village area. Additionally, it is better to avoid distribution losses in its entirety by placing in-building boilers in each building or each building cluster. Therefore, this plan envisions that each building or groups of buildings within close proximity to each other would have their in-building boilers. The boilers would be typically on the building roof and each building would have its own hydronic distribution pumps to circulate heating hot water through the various heating coils. Roof location for boilers makes it less complex to build flue. Ideally, each building would accommodate a small penthouse for mechanical systems which would include boiler(s) for meeting hot water heating needs.

Based on a combined building development plan of an estimated 3.3 Million GSF (excluding parking structures which do not require any heating), the combined heating capacity in in-building boilers would be approximately 77 MMBtuh.

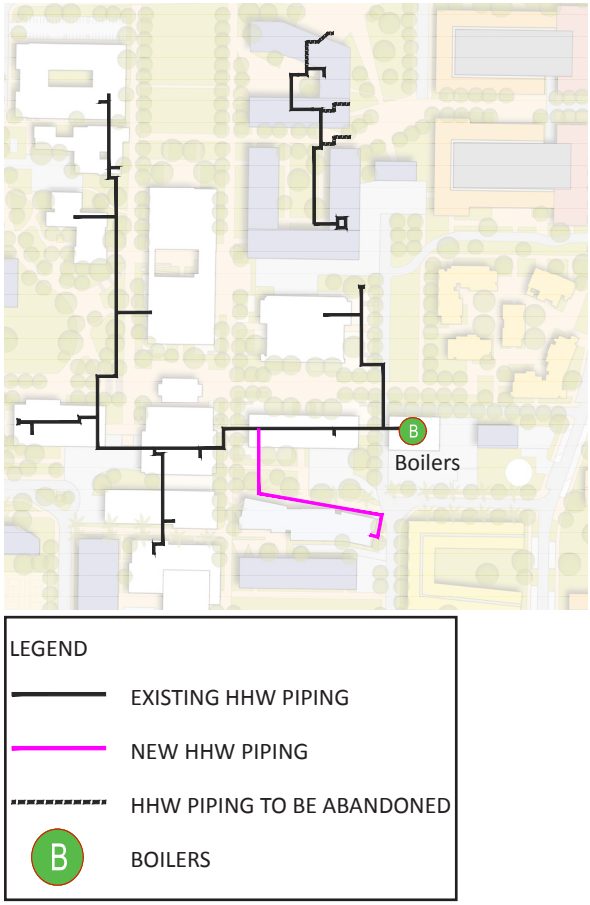


FIGURE 4. HHW PIPING LAYOUT

	Parking	Multi-Family	Retail	Apartments	Business Park and Misc	Total
GSF	1,853,040	2,560,642	96,085	-	572,400	5,082,167
BTU/GSF (Load)	-	25	15	25	20	
MMBtuh	**-**	**64**	**1.4**	**-**	**11**	**77**

TABLE 3. UNIVERSITY VILLAGE AREA HEATING LOAD ESTIMATES

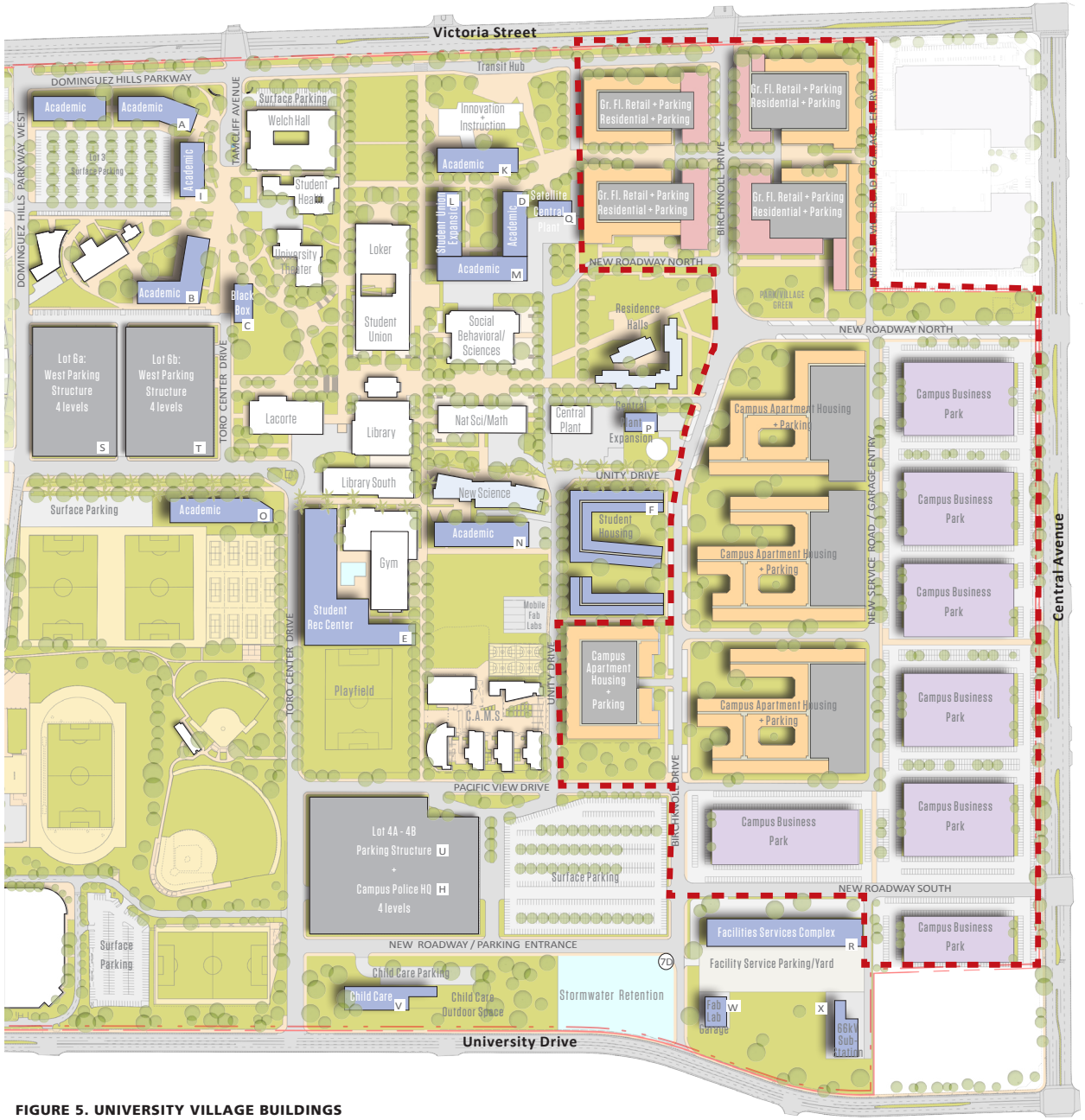


FIGURE 5. UNIVERSITY VILLAGE BUILDINGS

CAMPUS NATURAL GAS SYSTEM

NATURAL GAS INFRASTRUCTURE HIGHLIGHTS

PART-A: CORE CAMPUS

Core Area: 1.8 million GSF

Long Term Gas Heating: 54 MMBTUH (Existing buildings and proposed core campus)

Strategy: Provide new 4" gas line from Central Avenue to the Central Plant. Pickup the north side new core campus buildings from the two 2" SCG lines at Victoria Street.

CORE CAMPUS BUILDINGS LIST

A	Academic
B	Academic
C	Black Box Theatre
D	Academic
E	Rec Center
F	Student Apartments
I	Academic
J	Academic
K	Academic
L	Student Union Expansion
M	Academic
N	Academic
O	Academic
P	Central Plant Expansion
Q	Satellite Central Plant
R	Facilities Services Complex
V	Child Care
W	Fab Lab Garage
*	Residence Halls

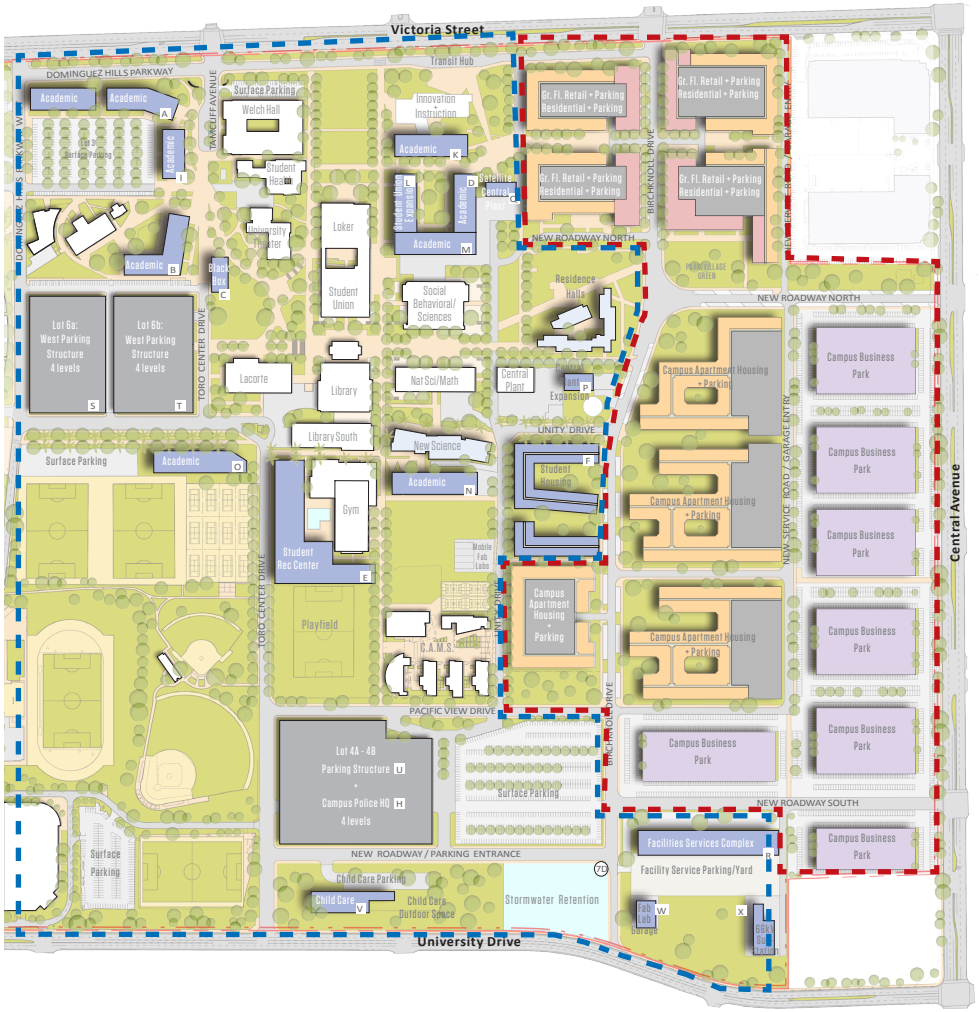


FIGURE 1. HIGHLIGHTS OF CAMPUS MASTER PLAN NATURAL GAS INFRASTRUCTURE

LEGEND

- CORE CAMPUS
- UNIVERSITY VILLAGE AREA

PLAN NORTH

PART-B: UNIVERSITY VILLAGE [UV]

UV Parking Area: 1.9 million GSF
UV Building Area: 3.3 million GSF

Long Term Gas Heating: 77 MMBTUH

Strategy: In three-phase development scenario, add three new SCG gas lines from Central Avenue. Lines will be 3" operating at 60 psg. Each line capable of supporting one third of the long term demand of 90 MMBtuh.

UNIVERSITY VILLAGE - PROPOSED DEVELOPMENT

- Campus Apartment Housing
- Campus Business Park
- Retail

PART A: CORE CAMPUS NATURAL GAS INFRASTRUCTURE

A. EXISTING SYSTEMS

The CSU Dominguez Hills campus has over 15,000 lineal feet of natural gas distribution piping underground and in the tunnel system. This piping can be grouped into the following three categories:

1)Southern California Gas Piping (9,500 feet)

2)CSU Piping Underground (2,800 feet)

3)CSU Piping in Tunnels (2,700 feet)

Southern California Gas (SCG) has main gas lines entering the campus at five different locations. SCG owns and is responsible for the piping up to the meter. Table 1 summarizes the areas served by each SCG main line entrance and respective campus area served. Figure 2 presents a schematic of the existing natural gas infrastructure.

A large part of the natural gas demand for the core campus is attributed to the campus' central heating hot water and chilled water system. For heating hot water, the plant currently has one, 12 MMBtuh output gas fired boiler. For chilled water, the plant has two 1,000 Ton gas-fired absorption chillers. If needed, the absorption chillers are also capable of providing heating hot water to supplement boiler heating capacity.

Main Gas Service Location	Campus Area Served	Meter Location
Victoria Street (1 of 3)	1) Extended Education (Bldg 106)	Building 106
Victoria Street (2 of 3)	1) School of Education (Bldg 14)	Building 14
	2) Small College Complex (Bldgs 1-11, 13)	
Victoria Street (3 of 3)	1) Student Housing SH-1 (Bldg 70)	Meter at Each Building
Central Avenue	1) Student Housing SH-2 (Bldg 71)	Meter at Each Building
	2) Central Plant (Building 87) & Remaining Campus Bldgs *	Central Plant
	3) South Academic Complex 1, 2, 3 (Bldgs 100, 102, 103, 104)	Building 100
	4) California Academy of Math and Science (Bldg 107)	Building 107
University Drive	1) Physical Plant (Building 80)	At Physical Plant

* Gas from the central plant serves the remaining buildings on campus through the tunnel.

TABLE 1. EXISTING SCG GAS LINES AND AREAS SERVED

B. SYSTEM CHANGES UNDERWAY (JULY 2017)

There are presently no known changes planned or in the works for the natural gas infrastructure.

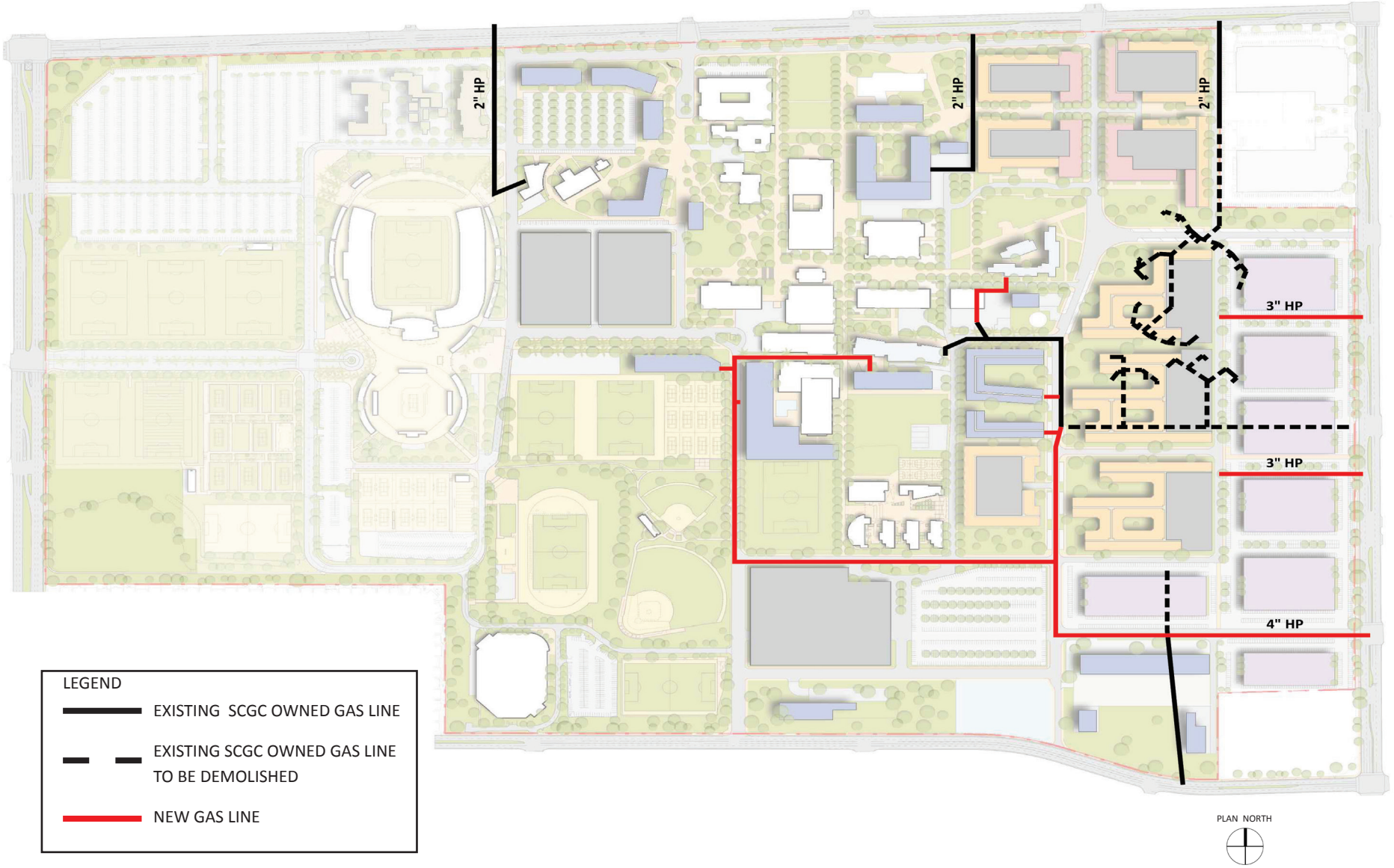


FIGURE 2. EXISTING AND NEW NATURAL GAS LINES

C. LOAD GROWTH ASSOCIATED WITH MASTER PLAN

Table 2 summarizes all the potential core campus buildings being considered for development as part of the Master Plan.

As was outlined in the heating infrastructure section, all new buildings considered for development in the Master Plan are proposed to have in-building natural gas fired boilers to meet their heating needs. Aside from the New Science Building which is presently in construction, none of the new buildings will be tied to the central plant HHW loop.

Based on addition of about 1.9 million GSF of buildings per Table 2, the long term additional gas heating loads that need to be met by the natural gas infrastructure is estimated at 39 MMBtuh. Of this, the housing complex is expected to be approximately 13 MMBtuh and the rest of the new core campus buildings would be approximately 26 MMBtuh. For planning purposes, these estimates use an index of 25 Btuh/SFT for housing and 20 Btuh/SFT for rest of the new buildings. The higher index for housing is to accommodate the higher domestic hot water needs due to shower water and dining facility needs.

D. MEETING LONG TERM NATURAL GAS NEEDS WITHIN THE CORE CAMPUS

The existing Core Area gas heating peak is estimated as 15 MMBtuh. With addition of 39 MMBtuh for the new Core Area heating needs, the total long term Core Area gas peak is estimated as 54 MMBtuh.

Note that the existing absorption chillers are proposed to be replaced with new electric chillers in the future. This will ultimately reduce the required natural gas capacity of the campus.

Since all new buildings in the Master Plan are proposed to have in-building boilers, new natural gas lines will be need to be routed to each. Figure 2 shows the proposed natural gas infrastructure system with natural gas lines to each new building. The figure also shows the gas lines to be demolished and rerouted because of obstructions in the proposed building locations.

The majority of new core campus buildings can likely be picked up by the two 2" SCG gas lines at Victoria Street. For each new building that is tied in to an existing gas line, careful consideration gas pressures, pipe size, and expected losses needs to be taken. Campus will need SCG approval for all gas modifications.

One important item of note is that the existing SCG gas line at Central Avenue will need to be demolished and relocated when the University Village area buildings are developed. Because this line is critical and presently serves heating and cooling needs of the campus, demolition of the existing line will only occur after a new line is installed and ready to serve present loads.

A 4" line carrying 60 SIG gas will have a pressure drop of less than 10% when 54 MMBtuh of long term gas has to be transported over approximately 3000 feet. This length corresponds to a new line that SCG will need to bring to the Central Plant location. Such a line would be sufficient for meeting long term core campus needs.

Building ID	Building Name	GSF
A	Academic	158,572
B	Administration	131,800
C	Black Box Theatre	7,640
D	Academic	68,000
E	Rec Center	148,400
F	Apartments	414,403
I	Incubator	57,128
J	Academic	136,050
K	Academic/Admin	105,850
L	Student Union Expansion	85,000
M	Academic/Admin	94,360
N	Academic/Admin	116,250
O	Academic/Admin	104,020
	Residence Hall	90,000
	New Science Building	85,000
P	Central Plant Expansion	12,000
Q	Satellite Central Plant	5,500
R	Facilities Services Complex	46,895
V	Child Care	17,966
W	Fab Lab Garage	6,916
Total:		**1,891,750**

TABLE 2. CORE CAMPUS - ALL CORE CAMPUS BUILDINGS

PART B: UNIVERSITY VILLAGE AREA NATURAL GAS INFRASTRUCTURE

A. LOAD GROWTH ASSOCIATED WITH MASTER PLAN

Table 3 summarizes the potential private/public partnership buildings being considered for development as part of the Master Plan in the University Village area. The types of development include 1.9 million GSF of parking structures, 2.6 million GSF of multi-family residential units, 96,085 GSF of retail areas, and 572,400 GSF of campus business park buildings. Figure 3 shows the University Village buildings.

The long term additional gas heating loads that need to be met by the natural gas infrastructure is estimated at 77 MMBtuh. For planning purposes, these estimates use an index of 25 Btuh/SFT for multi-family residential units and apartments, 20 Btuh/SFT for campus business park buildings, and 15 Btuh/SFT for retail buildings.

B. MEETING LONG TERM NATURAL GAS NEEDS WITHIN THE UV AREA

A vast majority of the existing gas piping serving the east end of the campus (i.e., mainly housing buildings) will need to be demolished to accommodate the proposed new University Village development. Existing gas lines to this area feed from Victoria Street, Central Avenue, and University Drive.

The University Village development entails a long term load of approximately 90 MMBtuh. A 3,000 ft. long line carrying gas in a 6" pipe will be able to deliver the same to a common metering point if that option is ever pursued. More likely, SCG would consider providing long term capacity in three phases. Each phase could represent a tap off their main line that runs North South along Central Avenue.

Each such phase could involve a 3" line operating at 60 psig. that can carry gas over approximately 2000 feet with less than 10% pressure drop. Each such line would be capable of supporting roughly a third of the long term demand of 77 MMBtuh.

Figure 2 presents the proposed three phase approach for new natural gas service lines to serve the University Village Area.

	Parking	Multi-Family	Retail	Apartments	Business Park and Misc	Total
GSF	1,853,040	2,560,642	96,085	-	572,400	5,082,167
BTU/GSF (Load)	-	25	15	25	20	
MMBtuh	**-**	**64**	**1.4**	**-**	**11**	**77**

TABLE 3. UNIVERSITY VILLAGE AREA NATURAL GAS NEED ESTIMATES

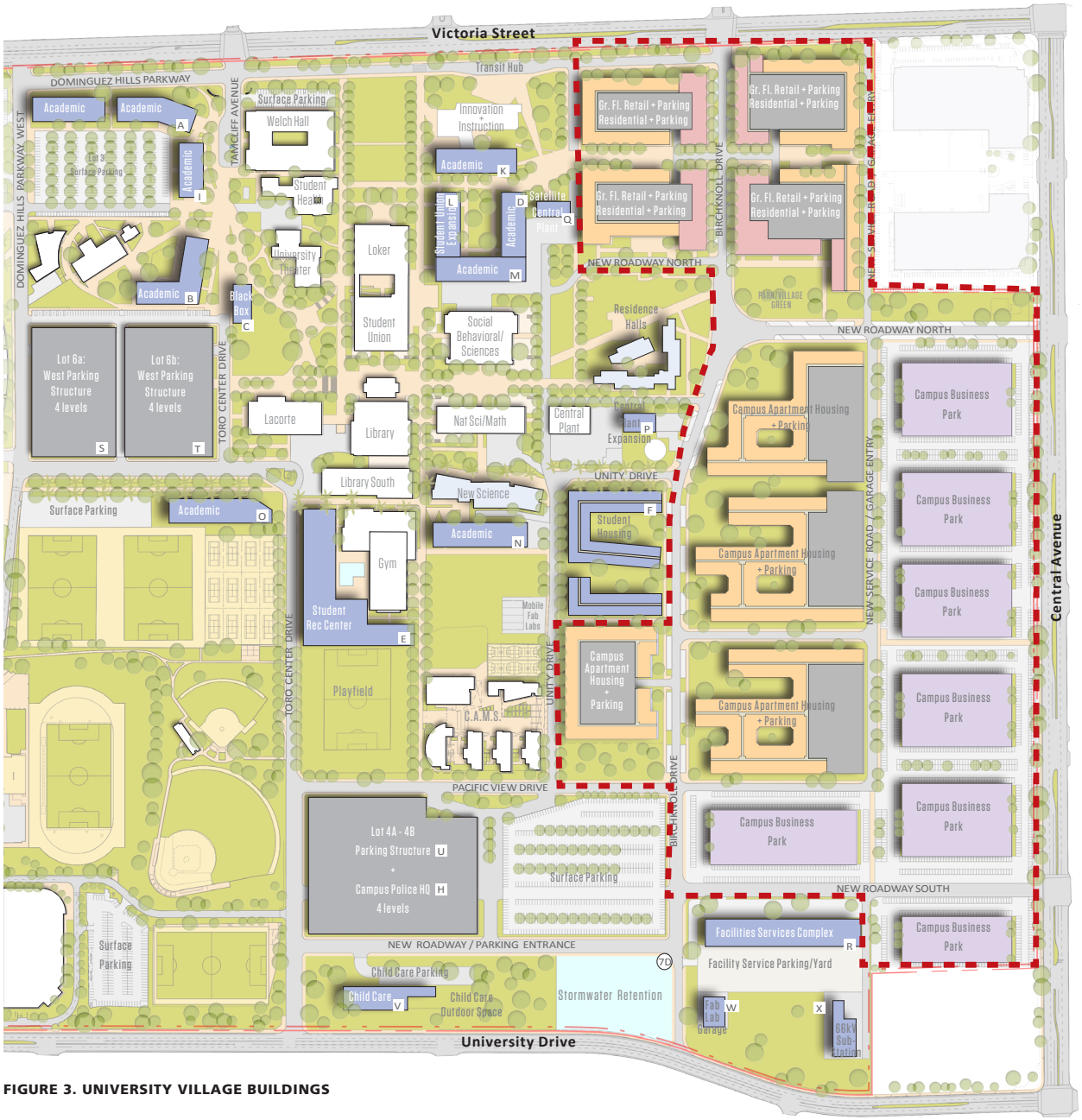


FIGURE 3. UNIVERSITY VILLAGE BUILDINGS

PHOTOVOLTAIC CONCEPT

PHOTOVOLTAIC CONCEPT HIGHLIGHTS

PART-A: CORE CAMPUS

Core Area: 1.7 million GSF

Long Term PV Capacity: 7.6 MW

CORE CAMPUS BUILDINGS LIST

A	Academic
B	Academic
C	Black Box Theatre
D	Academic
E	Rec Center
F	Student Apartments
I	Academic
J	Academic
K	Academic
L	Student Union Expansion
M	Academic
N	Academic
O	Academic
P	Central Plant Expansion
Q	Satellite Central Plant
R	Facilities Services Complex
V	Child Care
W	Fab Lab Garage
*	Residence Halls

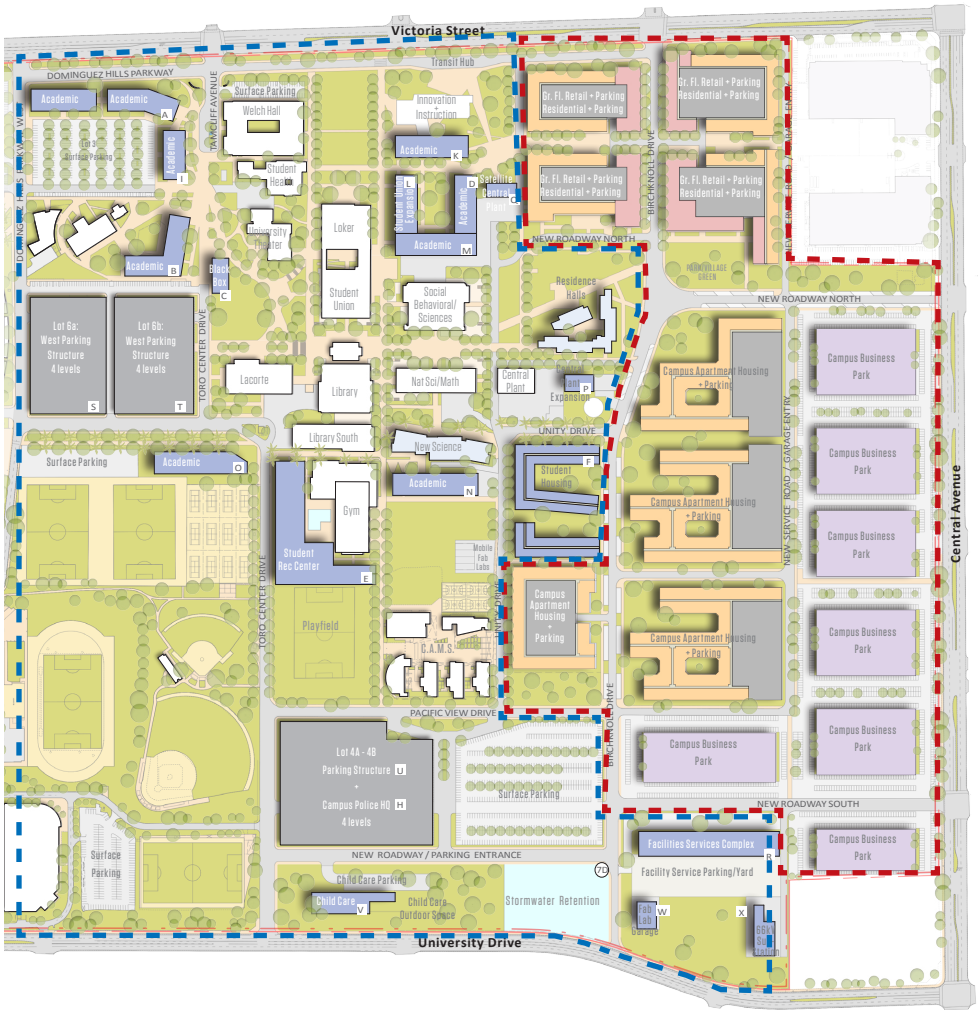


FIGURE 1. CORE CAMPUS AND UNIVERSITY VILLAGE SEGGREGATION

LEGEND

CORE CAMPUS

UNIVERSITY VILLAGE AREA

PLAN NORTH

PART-B: UNIVERSITY VILLAGE [UV]

UV Parking Area: 1.9 million GSF

UV Building Area: 3.8 million GSF

Projected PV Capacity: 9.9 MW

UNIVERSITY VILLAGE - PROPOSED DEVELOPMENT

- Campus Apartment Housing
- Campus Business Park
- Retail

SUMMARY

Part A

Estimates for photovoltaic potential were determined for the core campus area based on layout of PV arrays, using the solar module Solarworld-350. Each array consists of anywhere between 120 and 4,980, in strings of twelve modules, with a combined circuit voltage of 576 Volts (DC). It is assumed that the overall installation will have distributed inverters on the roofs of the buildings and structures, with the AC output delivered to a common switchboard in the electrical room. The core campus area has a potential of 7.6 MW of PV. This is based on using a maximum of 40% roof area for buildings, and allowing the balance for access as well as potential HVAC equipment.

Part B

The University Village area photovoltaic potential is projected based on assuming 21 sq. ft. per installed PV module, for a maximum of 33% of total roof area for buildings and 48% roof area for parking structures, the average percent coverages on the core campus buildings.

The overall campus photovoltaic potential is summarized as 7.6 MW for the core campus, and 7.1 MW for the University Village building rooftops and 2.8 MW for the University Village parking structures, a total of 9.9 MW for the University Village area.

PART A: CORE CAMPUS PHOTOVOLTAIC CONCEPT

A. SITE MAP AND LAYOUT SUMMARY

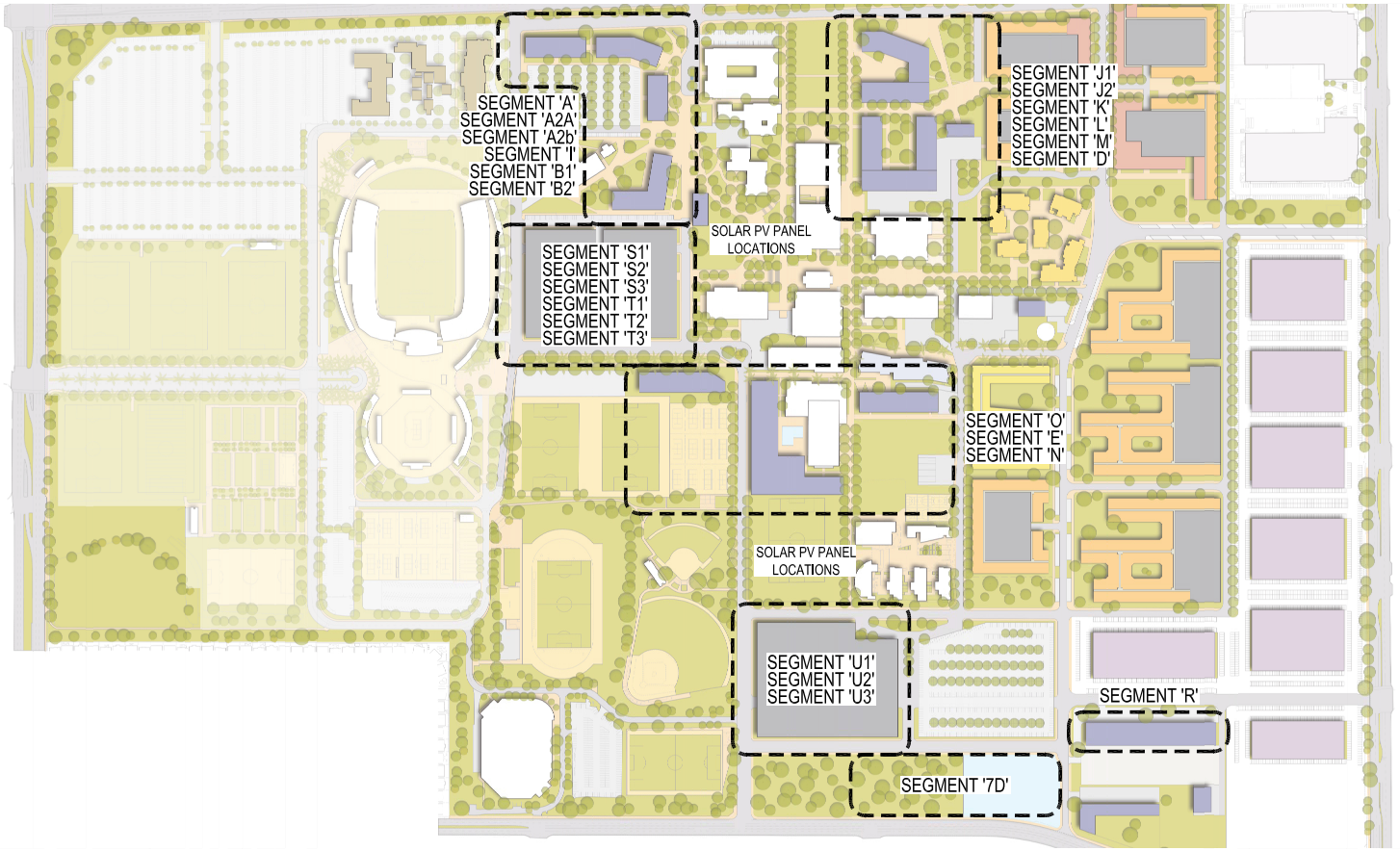


FIGURE 1: PRELIMINARY LAYOUT FOR PHOTOVOLTAIC SYSTEMS ON NEW BUILDINGS, PARKING STRUCTURES, AND LAND PARCEL.

B. PV PANEL SCHEDULE AND SUMMARY OF ROOF AREA

Building/Area	Plan ID	# of PV Modules	Total DC Capacity (kW)	Estimated AC Generation (kWh)	Total Roof Area (sq. ft.)	Total PV Area (sq. ft.)	Percent of Roof Space (%)	Total GSF (sq. ft.)
A WEST	A1	300	105	157,500	19,006	6,300	33%	198,215
A EAST	A2a	168	59	88,200	20,638	6,509	32%	
	A2b	144	50	75,600				
I	I	228	80	119,700	14,282	4,830	34%	71,410
B	B1	264	92	138,600	26,360	8,082	31%	105,440
	B2	120	42	63,000				
J	J1	120	42	63,000	22,262	6,090	27%	111,310
	J2	168	59	88,200				
K	K	348	122	182,700	19,915	7,349	37%	99,570
L, M, & D	L	300	105	157,500	59,591	21,418	36%	298,185
	M	420	147	220,500				
	D	300	105	157,500				
O	O	420	147	220,500	26,005	8,819	34%	130,025
E	E	1,428	500	749,700	75,575	30,028	40%	151,148
N	N	396	139	207,900	24,755	8,315	34%	123,770
S1	S1	2,160	756	1,134,000				
S2	S2	204	71	107,100				
S3	S3	204	71	107,100				
T1	T1	2,448	857	1,285,200				
T2	T2	204	71	107,100				
T3	T3	204	71	107,100				
U1	U1	4,908	1,718	2,576,700				
U2	U2	324	113	170,100				
U3	U3	264	92	138,600				
R	R	720	252	378,000	47,610	15,119	32%	47,000
7D	7D	4,980	1,743	2,614,500				
Total		**21,744**	**7,610**	**11,415,600**	**355,998**	**122,859**	**35%**	**1,336,073**

TABLE 1. PV PANEL SCHEDULE AND

NOTES

1. The photovoltaic panel type and module used in this design is Solarworld monocrystalline SW-350 with dimensions of 78.46”L X 39.4”W.

2. Panels are tilted at 12° and the gap provided between panels is 1/2”.

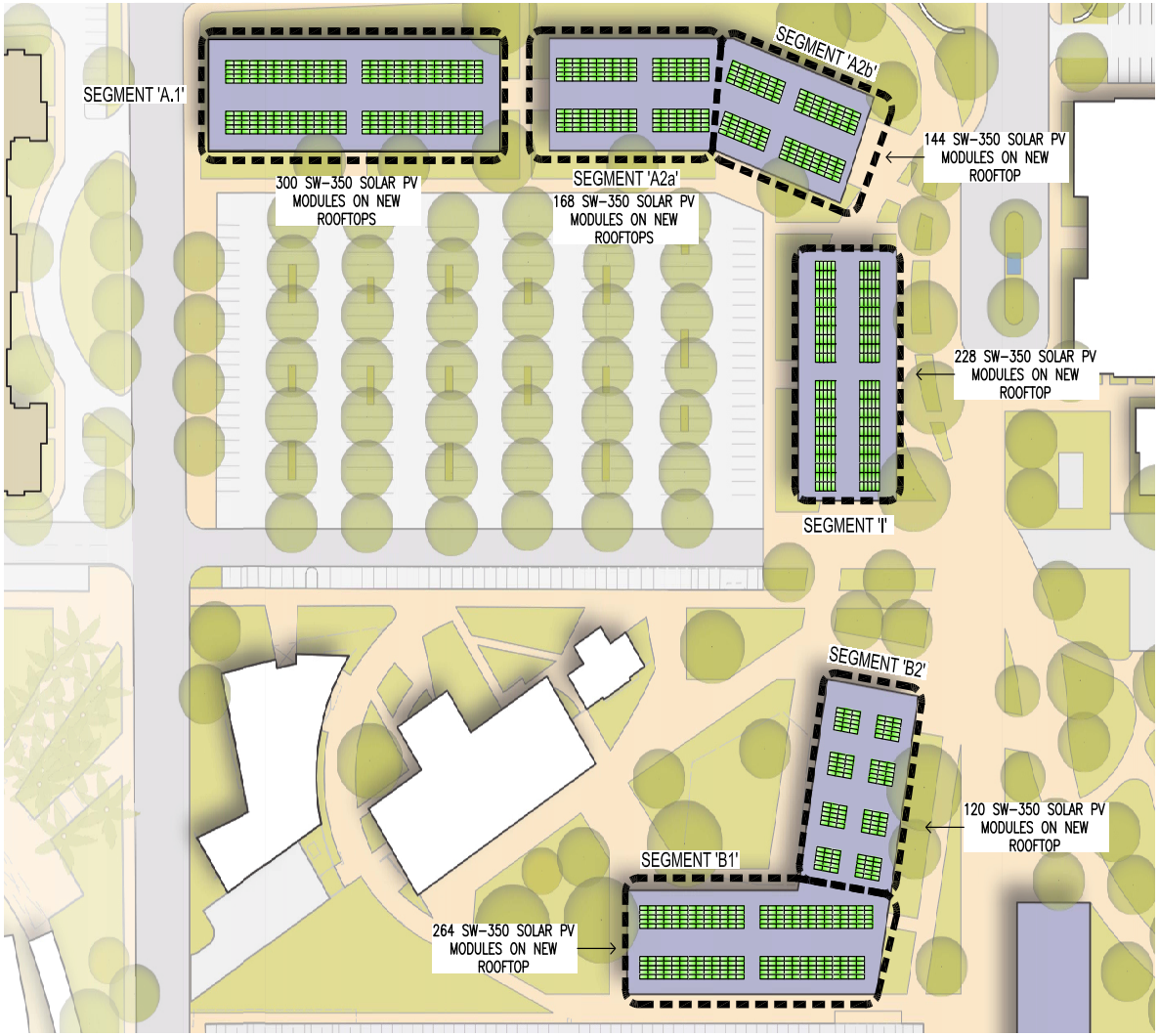
3. Array types are fixed (low-framed sloped rail racking system) for rooftop and ground mount systems, and fixed (canopy-single and double bay) for parking structure systems.

4. AC generation is estimated at 1,500 kWh per kW DC installed.

5. Minimum gaps of 20’ are provided on all rooftops as provision for mechanical system space.

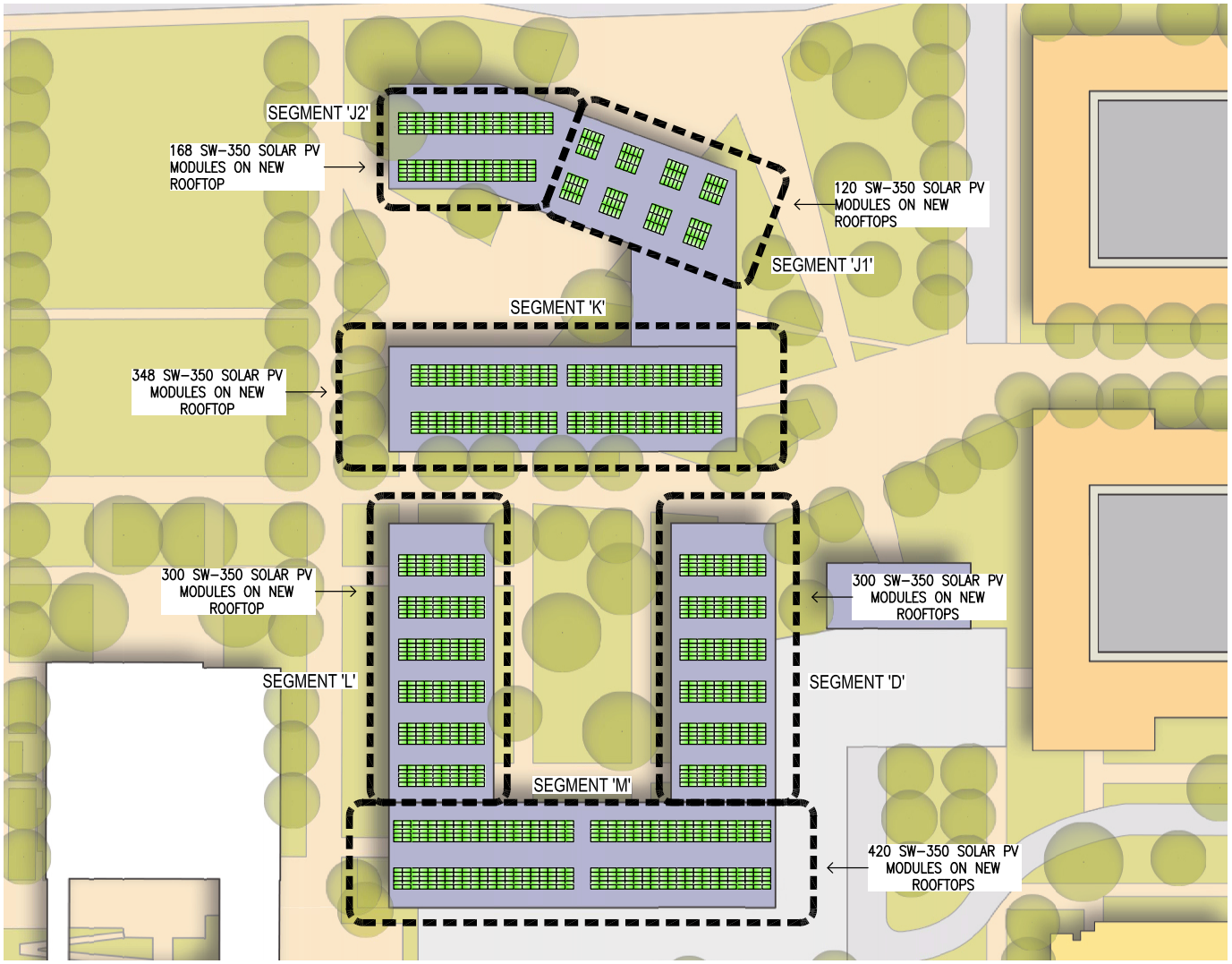
C. PV PANEL LAYOUTS

C.1 A BUILDINGS, BUILDING I, AND BUILDING B



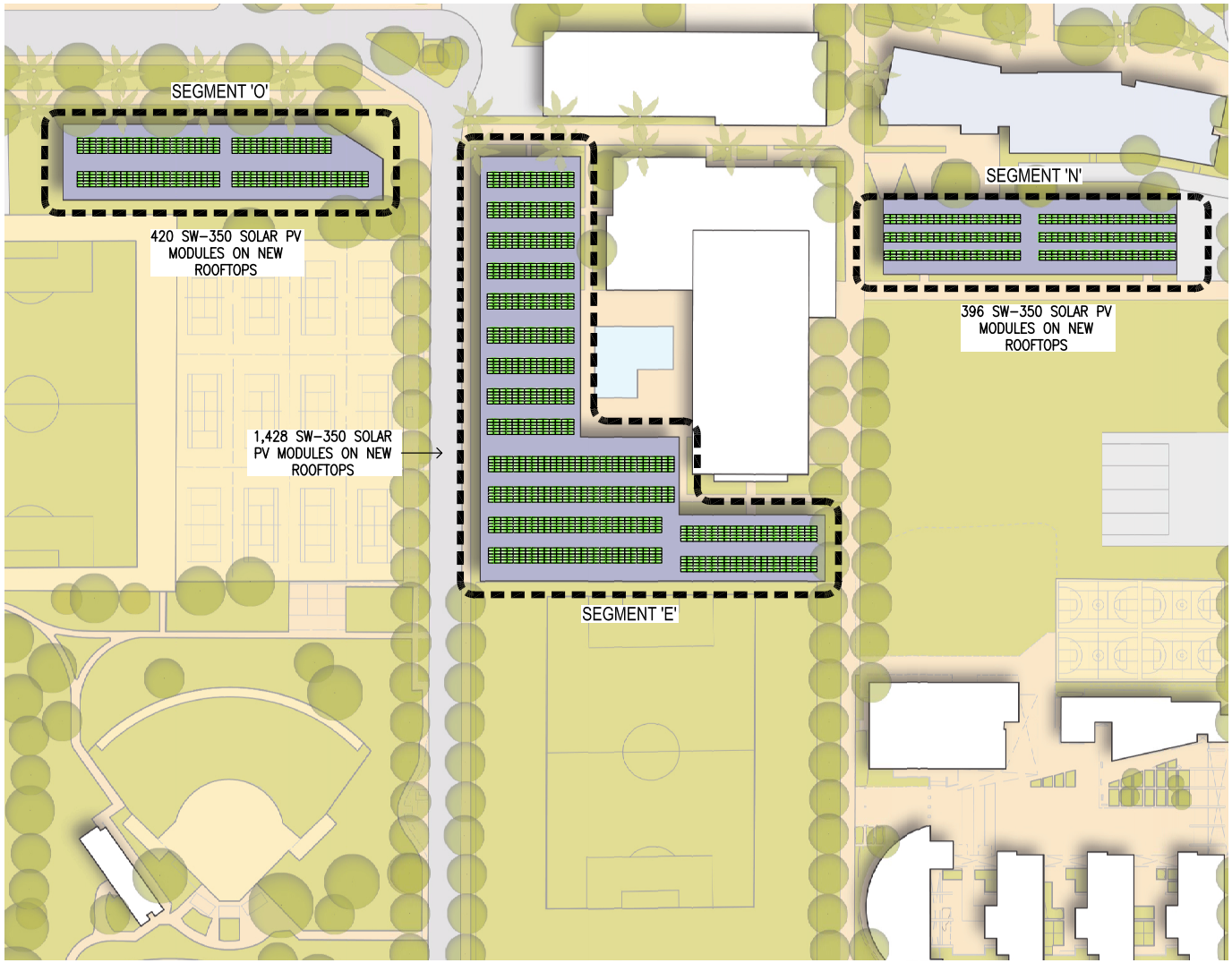
NOTES:
1. PANELS FACING SOUTH (SEGMENTS 'A1", 'A2A", AND 'B1'), SOUTHWEST (SEGMENT 'A2B"), WEST (SEGMENT 'I'), AND SOUTH-SOUTHWEST (SEGMENT 'B2').

C.2 BUILDINGS J, K, L, M, AND D



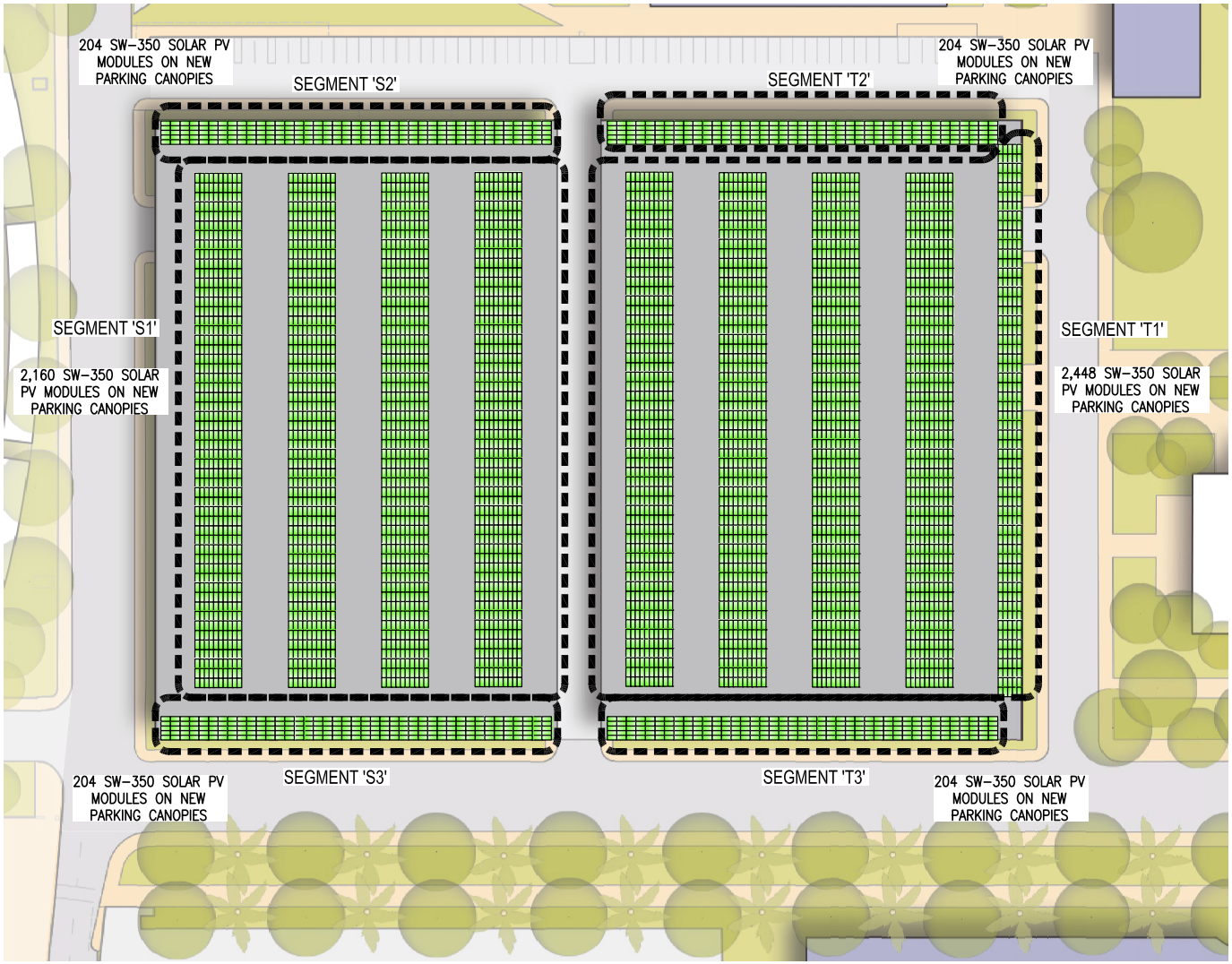
NOTES:
1. PANELS FACING SOUTH (SEGMENTS 'J2', 'K', 'L', 'M', AND 'D'), AND WEST-SOUTHWEST (SEGMENT 'J1').

C.3 BUILDINGS O, E, AND N



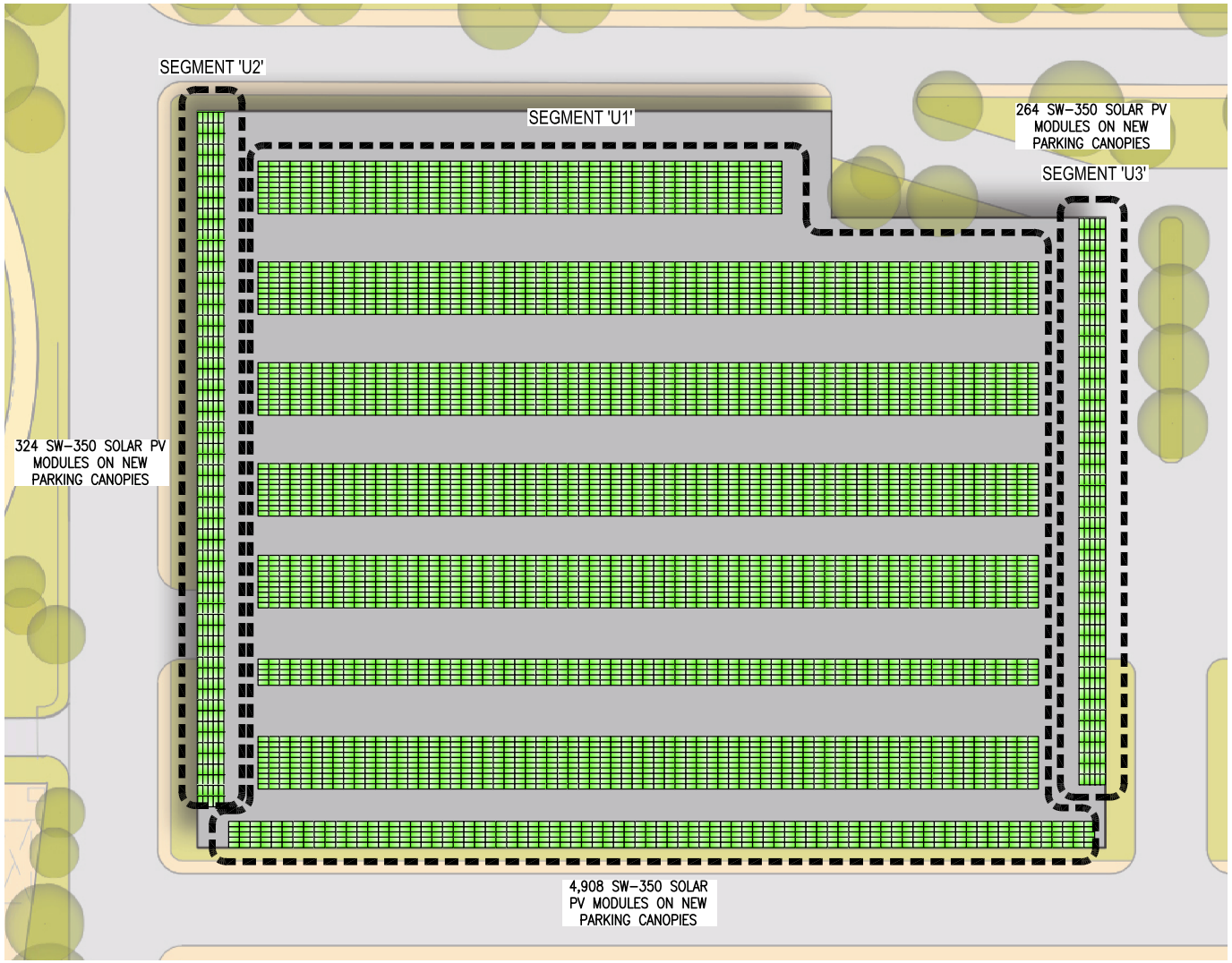
NOTES:
1. PANELS FACING SOUTH (ALL SEGMENTS).

C.4 PARKING STRUCTURES S AND T



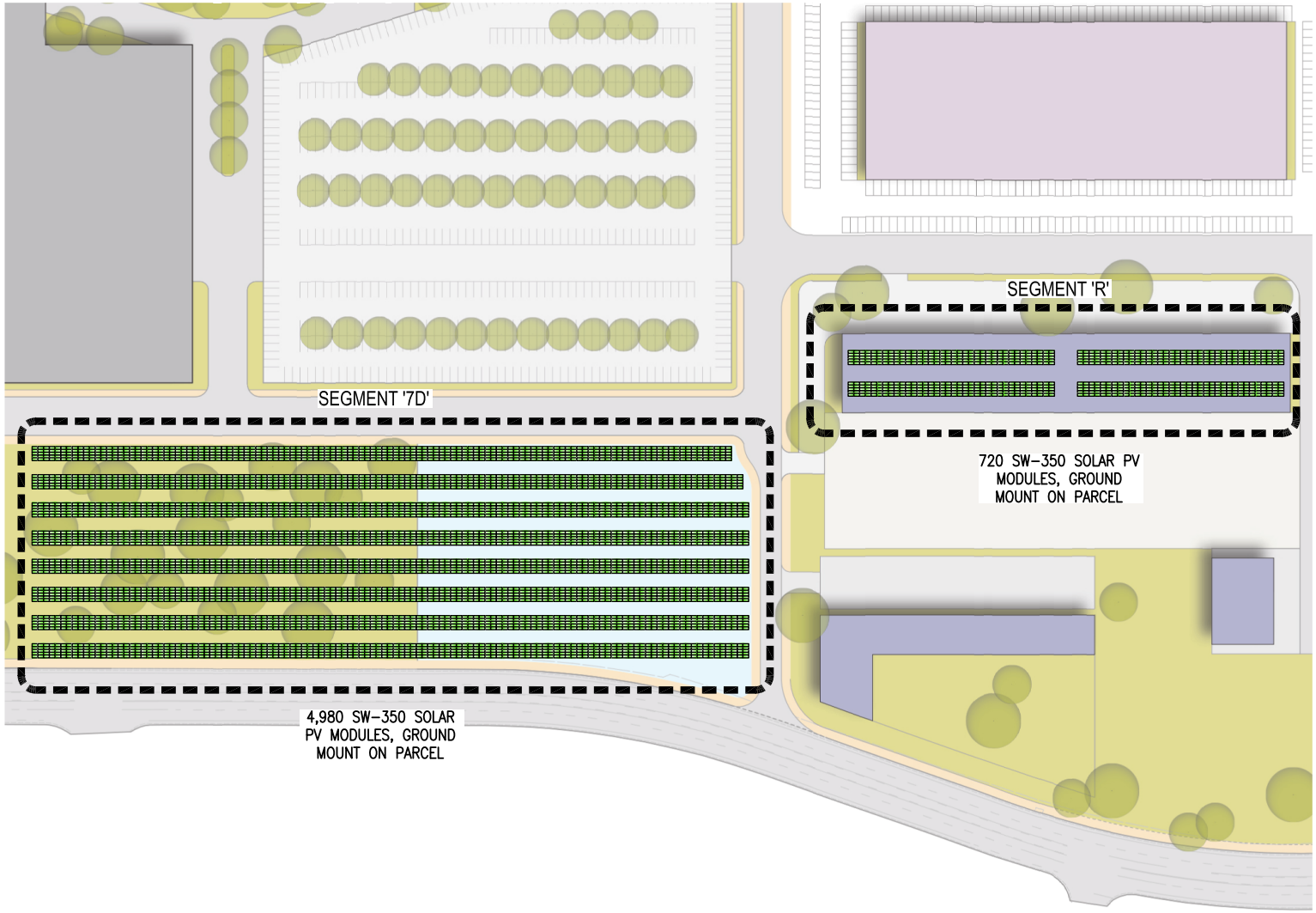
NOTES:
1. PANELS FACING WEST (SEGMENTS 'S1' AND 'T1'), AND SOUTH (SEGMENTS 'S2', 'S3', 'T2', AND 'T3').

C.5 PARKING STRUCTURE U



NOTES:
1. PANELS FACING SOUTH (SEGMENT 'U1'), AND WEST (SEGMENTS 'U2' AND 'U3').

C.6 BUILDING R AND PARCEL 7D



NOTES:
1. PANELS FACING SOUTH (ALL SEGMENTS).

PART B: UNIVERSITY VILLAGE AREA PHOTOVOLTAIC PROJECTION

A. UNIVERSITY VILLAGE PROJECTED CAPACITIES

Building/Area	Plan ID	# of PV Modules	Total DC Capacity (kW)	Estimated AC Generation (kWh)	Total Roof Area (sq. ft.)	Total PV Area (sq. ft.)	Percent of Roof Space (%)	Total GSF (sq. ft.)
1A	1A	840	294	441,000	54,039	17,833	33%	333,040
1A Parking	1A	840	294	441,000	37,204	17,858	48%	223,200
1B	1B	948	332	497,700	60,591	19,995	33%	351,470
1B Parking	1B	840	294	441,000	37,204	17,858	48%	223,200
3A	3A	1,176	412	617,400	75,139	24,796	33%	301,384
3B	3B	1,524	533	800,100	97,204	32,077	33%	389,556
4A	4A	840	294	441,000	54,040	17,833	33%	310,345
4A Parking	4A	840	294	441,000	37,204	17,858	48%	223,200
4B	4B	1,116	391	585,900	71,293	23,527	33%	403,246
4B Parking	4B	1,188	416	623,700	52,162	25,038	48%	313,200
5A	5A	1,320	462	693,000	84,386	27,847	33%	337,804
5A Parking	5A	1,452	508	762,300	64,031	30,735	48%	256,080
5B	5B	1,776	622	932,400	113,207	37,358	33%	453,168
5B Parking	5B	1,452	508	762,300	64,031	30,735	48%	246,480
5C	5C	1,776	622	932,400	113,239	37,369	33%	453,260
5C Parking	5C	1,404	491	737,100	61,630	29,582	48%	246,480
6A	6A	5,424	1,898	2,847,600	345,424	113,990	33%	345,600
6B	6B	2,196	769	1,152,900	140,366	46,321	33%	140,400
7A	7A	1,356	475	711,900	86,395	28,510	33%	86,400
Total		**28,308**	**9,908**	**14,861,700**	**1,648,788**	**597,120**	**36%**	**5,637,513**

TABLE 2. UNIVERSITY VILLAGE PROJECTED CAPACITIES

NOTES

Projected PV for the University Village based on the benchmark of an average 33% coverage for core building rooftops and 48% coverage for core parking structures.

The University Village potential capacities are 20,292 panels for 7.102 MW installed and an estimated 10,653,300 kWh generated, for building rooftops, and 8,016 panels for 2.806 MW installed and an estimated 4,208,400 kWh generated, for parking structures.

ENERGY USAGE AND GHG EMISSIONS

A. EXISTING ENERGY USE AND GHG EMISSIONS

During the latest calendar year (2016), campus energy use records indicate that the overall electricity use was 16.5 million kWh and Natural Gas usage was approximately 985,000 Therms. For the 1.25 million GSF of buildings on campus, this is equivalent to a site energy use index of 12.9 kWh/GSF for electricity and 0.79 Therms/GSF for natural gas. The overall site Energy Use Index (EUI) is estimated as 122,708 Btu/kWh. The existing GHG (Scope 1 and Scope 2) emissions are estimated at 10,068 Tons, which is approximately 3,803 Tons greater than the 1990 emission levels recorded at campus based on the 1990 energy use levels (See Figure 1).

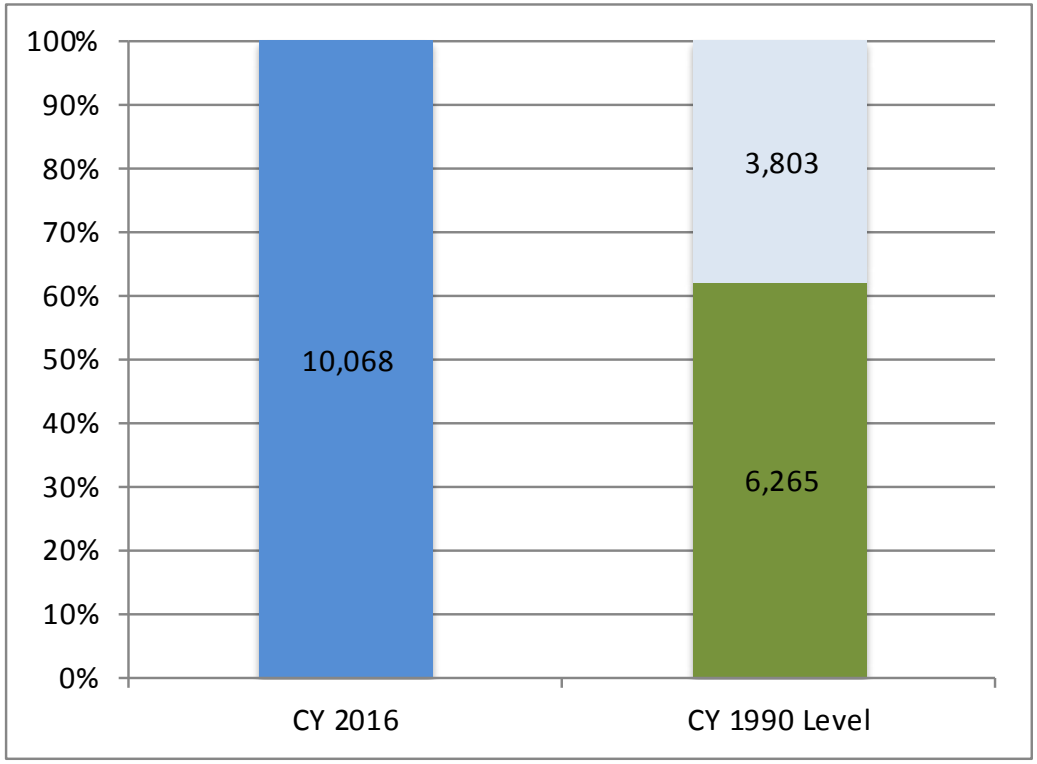


FIGURE 1. GHG EMISSIONS (METRIC TONNES) 2016 VS. 1990 LEVELS (REDUCTION REQUIRED PER AB 32 - 3,803 TONNES)

B. ONGOING AND FUTURE CONSERVATION EFFORTS

One of the significant sources of GHG emissions is presently the two, 1,000 Ton gas fired absorption chillers that are used for providing cooling to a majority of the campus buildings. Conversion of the gas based absorption cooling to an electric chiller based cooling system using high efficiency electric chillers will result in a substantial reduction in the GHG footprint. Best estimates show that the proposed conversion will reduce GHG footprint by approximately 2000 Tons/year as shown below in Table 1.

Peak Tons	Annual Use (Ton Hours) [3]	Absorber Therms/Ton [1]	Annual Gas Use (Therms)	GHG lbs./Therm	GHG Emissions (Lbs./Year	GHG Emissions, Metric Tons/Year
1600	2,522,880	0.18	454,118	11.69	5,308,142	2,408
Peak Tons	Annual Use (Ton Hours)	Electric Chiller kW/Ton [2]	Annual Electricity	GHG lbs./kWh	GHG Emissions (Lbs./Year	GHG Emissions, Metric Tons/Year
1600	2,522,880	0.55	1,387,584	0.65	895,463	406
Reduction Expected with All Electric Chiller Configuration (Metric Tons/Year)						2,002

TABLE 1. GHG REDUCTION THROUGH CONVERSION TO ELECTRIC CHILLERS

In addition, the campus continually strives to enhance the energy efficiency in buildings through a variety of measures. The ongoing and future measures are expected to include such projects as:

- Renovation of building lighting systems using LED lighting technology
- Use of smart lighting controls where every fixture has the capability to be programmed and dimmed based on occupancy and daylight levels
- Upgrade of old control HVAC controls to modern direct digital controls
- Replacement of old HVAC units with high efficiency HVAC units
- Ongoing monitoring based commissioning program
- Use of more efficient (energy valves) control valves for the control of building heating and cooling coils

Based on a long term energy use reduction of 35% in building energy usage using such projects, Table 2 presents an estimate of reduction in GHG emissions based on energy efficiency improvements.

A cooling tower replacement project is underway to replace the existing cooling towers that have deteriorated beyond repair. Once these new towers are in place, the towers can provide cooling capacity for 2,400 Tons of cooling through high efficiency electric chillers. The cooling tower structure that is being built can accommodate one more tower cell, bringing the total tower capacity to 3,200 Tons as future loads increase.

Since the existing chillers have also nearly reached the end of their useful life and there is a strong desire on part of the campus to reduce the GHG foot print through the use of high efficiency electric chillers, there is a strong likelihood that the existing absorption chillers will be replaced over the next three years. There are currently plans under way to build the first of the three 800 Ton electric chillers to help the central plant meet the additional loads associated with the new Science building which is in design and which is expected to demand approximately 400 Tons. The 800-Ton chiller would work in concert with the existing absorption chillers until there is funding available for replacing both the old absorption chillers with new electric chillers. The plant yard area which is south east of the existing plant building has been targeted as the potential spot for a new cooling system consisting of one or more electric chillers.

		Reduction
Assumtions	Building electricity use reduction target (%) through lighting and HVAC improvements	35%
	Heating use reduction through improved HVAC system operation	35%
Base Line	Base Case Electricity use (kWh)	5,791,581
	Base Case Gas use Therms (Excluding cooling related)	171,516
Reductions	GHG Reduction due to Building electricity conservation (lbs)	3,737,539
	GHG Reduction due to Building Heating system energy efficiency (lbs)	2,004,832
	Total Efficiency Related GHG Reduction (Metric Tons)	2,605
Impact	Most recent GHG Emissions Inventory (Metric Tons)	10,068
	% Reduction due to Energy Efficiency campuswide	26%

TABLE 2. ESTIMATED IMPACT OF ENERGY EFFICIENCY ON GHG EMISSIONS

C. IMPACT OF MASTER PLAN LOAD GROWTH- CORE CAMPUS

As energy standards become increasingly more stringent, there is reason to believe that new buildings developed over the next 20-years would be significantly more efficient that the buildings currently in operation. Table-4 estimates the energy use impact associated with new core campus buildings proposed under the Master Plan. Shown are impacts of both core campus growth and removals of the existing Pubelo Dominguez housing associated with the future development of the University Village area. Table 3 presents the extent of PV capacity required on campus to offset the net increases in GHG emissions and sustain the overall GHG carbon foot print to 1990 levels. Estimates show that an estimate 7.8 MW of PV, together with the 35% energy efficiency improvements, can help sustain the overall GHG footprint to 1990 levels.

D. IMPACT OF MASTER PLAN LOAD GROWTH - UV AREA

While the University Village buildings are situated on campus property, it is assumed for the purposes of the analysis presented herein that the GHG emissions associated with the University Village buildings would not count towards the campus GHG footprint. Accordingly, all emission estimates and discussion and findings related to achieving compliance with AB32 GHG emission levels are limited to the core area campus buildings only.

Item	Value
Baseline GHG Emissions (Metric Tons)	10,068
Masterplan Related Load Growth (Metric Tons)	4,700
Sum of Existing and MP Related Additions	14,768
Reduction from Use of All Electric Chiller (Metric Tons)	2,002
Reduction from Campuswide Building Efficiency (Metric Tons)	2,605
Balance Reduction Desired through Renewable Energy (Metric Tons)	3,356
Sum of All Target Reductions	7,963
Net After Reductions (or 1990 Levels)	6,805
Equivalent Amount of kWh to be Renewable (kWh)	12,455,294
Estimated kWh/Installed kW (kWh)	1,600
Estimated Installed PV Required (kW)	**7,785**

TABLE 3. RENEWABLE ENERGY PURCHASES REQUIRED FOR EMISSION REDUCTION TO 1990 LEVELS

			Estimated Electricity and Gas Usage				
Building ID	**Building Name**	**GSF**	**kWh/SFT**	**Therms/GSF**	**kWh/Year**	**Therms/Year**	**GHG Emissions (Metric Tons)**
A	Academic	158,572	6.2	0.085	983,146	13,479	361
B	Administration	131,800	6.2	0.085	817,160	11,203	300
C	Black Box Theatre	7,640	6.2	0.085	47,368	649	17
D	Academic	68,000	6.2	0.085	421,600	5,780	155
E	Rec Center	148,400	6.2	0.085	920,080	12,614	338
F	Apartments	414,403	6.2	0.085	2,569,299	35,224	944
I	Incubator	57,128	6.2	0.085	354,194	4,856	130
J	Academic	136,050	6.2	0.085	843,510	11,564	310
K	Academic/Admin	105,850	6.2	0.085	656,270	8,997	241
L	Student Union Expansion	85,000	6.2	0.085	527,000	7,225	194
M	Academic/Admin	94,360	6.2	0.085	585,032	8,021	215
N	Academic/Admin	116,250	6.2	0.085	720,750	9,881	265
O	Academic/Admin	104,020	6.2	0.085	644,924	8,842	237
	Residence Hall	90,000	6.2	0.085	558,000	7,650	205
	New Science Building	85,000	18.5	0.340	1,572,500	28,900	617
P	Central Plant Expansion	12,000	4.3	0.120	51,600	1,440	23
Q	Satellite Central Plant	5,500	4.3	0.120	23,650	660	10
R	Facilities Services Complex	46,895	4.3	0.120	201,649	5,627	89
V	Child Care	17,966	4.3	0.120	77,254	2,156	34
W	Fab Lab Garage	6,916	4.3	0.120	29,739	830	13
Total:		**1,891,750**			12,604,724	185,598	4,700

TABLE 4. ESTIMATION OF ENERGY USE ASSOCIATED WITH NEW ADDITIONS

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B.3: Electrical Infrastructure/Information Technology and Communication

The **University Village** is an urban design concept within the CSUDH 2018 Master Plan that integrates the academic core and the student residential community with a neighborhood of retail and business communities and campus apartment housing to create a live/work/play environment with synergistic connections to the University's mission and purpose. Unless otherwise noted, the Design Guidelines analyses and reports appearing in this Appendix address all the parcels of the University Village.

ELECTRICAL INFRASTRUCTURE HIGHLIGHTS

PART-A : CORE CAMPUS

Core Area: 2 million GSF

Long Term 12kV Power Capacity:
20 MVA

Strategy:Construct a new SCE service substation with a campus-owned transformer rated up to 15,000 kVA. Install a new 12kV, 1200A or 2000A main service switchgear with 8 new feeder breakers. Reconnect the existing Central Plant switchgear to the new service. Install two new 12kV loop feeders to supply a total of four 12kV loops. Rearrange and upgrade the campus 12kV infrastructure to create four areas to match the loop feeder capacity.

CORE CAMPUS BUILDINGS LIST

A	Academic
B	Academic
C	Black Box Theatre
D	Academic
E	Rec Center
F	Student Apartments
I	Academic
J	Academic
K	Academic
L	Student Union Expansion
M	Academic
N	Academic
O	Academic
P	Central Plant Expansion

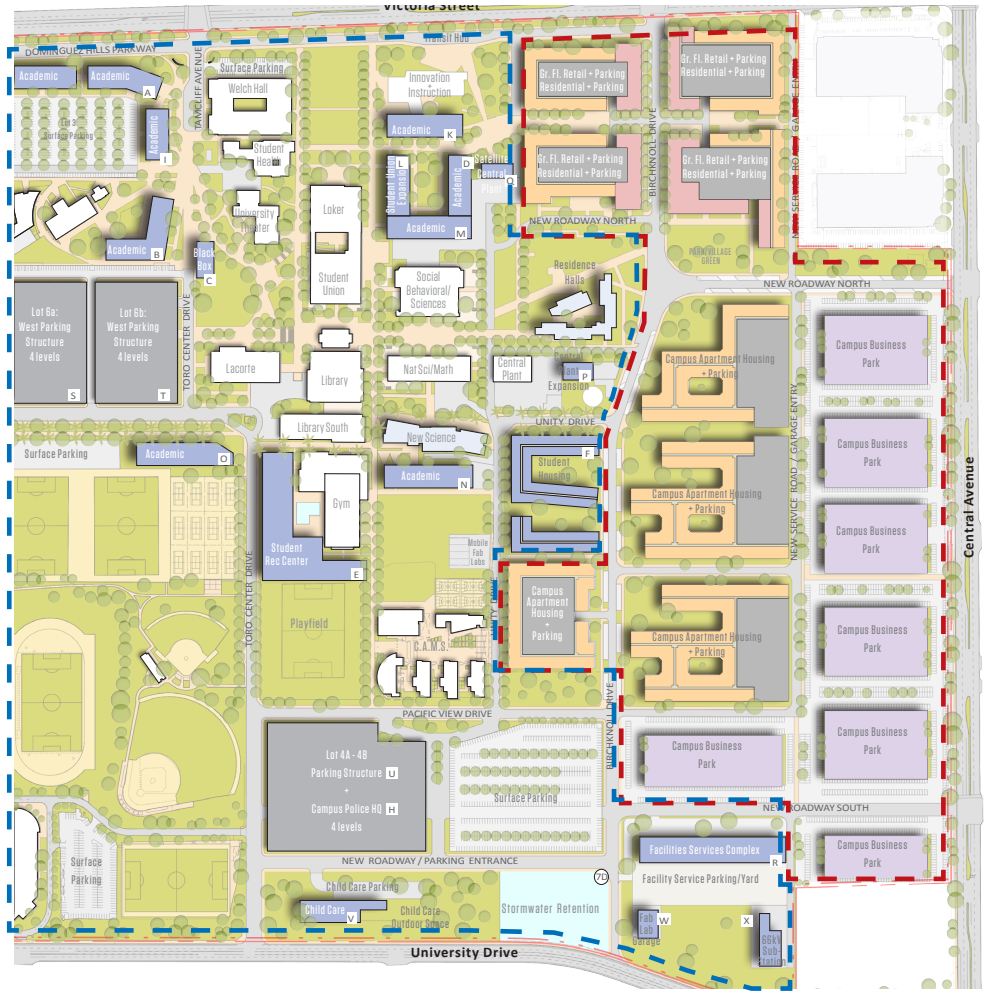


FIGURE 1. HIGHLIGHTS OF CAMPUS MASTER PLAN ELECTRIC POWER INFRASTRUCTURE

LEGEND
- CORE CAMPUS
- UNIVERSITY VILLAGE AREA

PLAN NORTH

Q	Satellite Central Plant
R	Facilities Services Complex
V	Child Care
W	Fab Lab Garage
*	Residence Halls

PART-B : UNIVERSITY VILLAGE [UV]

UV Parking Area: 1.7 million GSF
UV Building Area: 3.6 million GSF

Long Term 16.5kV Power Capacity:
20 MVA

Strategy: The University Village will consist of residential, commercial, retail, parking, and campus business park occupancies. Most of the occupancies will be third party operated, and separately metered. The University Village area load cannot be supplied by the new SCE Core Campus Substation. A separate SCE service substation with SCE operated and maintained distribution system is required. The University VIllage Authority has the option to own and operate the 12kV system. SCE operated distribution is preferred. The distribution system would have four SCE 16.5kV dedicated distribution system circuits, with each loop capable of supplying the entire load it serves from one or both feeders. Outdoor padmount sectionalizing switches and padmount transformers will supply the individual building parcels.

PART A: CAMPUS 12kV POWER INFRASTRUCTURE

A. EXISTING CONDITIONS

SCE provides the core campus utility electrical service and the service consists of two 16.5kV overhead distribution feeders configured in a preferred-emergency (PE) automatic transfer switch (ATS) configuration that was commonly utilized for a service configuration at that time the service was originally installed. The second SCE 16.5kV service feeder was referred to as "emergency" which meant it was to be used as a backup in the event the "preferred" feeder was unavailable. However, in the event of a total loss of the utility distribution system power, no power is available. CSUDH leases the 16.5kV outdoor PE service switchgear from SCE. SCE installed the substation and included SCE metering, station power, and two 16.5kV - 12kV, 5,000/6,250kVA transformers with low resistance grounded neutral. The campus SCE 16.5kV - 12kV service equipment is 427 years old. The two SCE transformers are shown in project records to be askarel-filled (PCB). The campus peak load is approximately 3360kVA, which is roughly 3.3VA/GSF.

The SCE service entrance cable is single conductor 500kcmil, 25kV rated cable and capable of carrying 450A continuously, which is equivalent to 9.4MVA. The SCE underground cable is the determining limiting factor for the existing campus service equipment capacity. SCE was consulted to establish the capacity limit of the existing 16.5kV service. The service limit is 4800kVA as of this writing, and will increase to 8300kVA in 2019. The 16.5kV-12kV service capacity for a single transformer is 5MVA/6.25MVA. The peak load is currently near 3.32MVA. The campus load is roughly 66% of the single transformer service capacity. Several new projects will result in an increase in the peak demand above the single transformer limit.

The CSUDH Central Plant 12kV switchgear campus feeders include HV-1 and HV-2, HV-5 and HV-6. The feeders are paired with one feeder from each side of the main service switchgear tie-breaker to form a 12kV loop distribution system. The original campus main 12kV switchgear was replaced circa 2004, along with sectionalizing switches (new SF6 switches). The two paired loop feeders are 250kcmil with an ampacity of 310A and are installed from Central Plant to the buildings on campus. However, the loop feeder conductor is reduced to #2AWG, Cu along its path limiting the loop to 130A. Feeders HV-1 and HV-2 supply power to the west part of the main campus, while feeders HV-5 and HV-6 supply power to the east side of campus with the dividing line being the main north-south pedestrian mall. Each loop is capable of supplying up to 6400kVA of load from a single feeder breaker, if the entire loop consisted of 250kcmil cable. The #2AWG limits the loop capacity to 2700kVA.

In addition to the SCE Central Plant 12kV service, the campus has three other SCE services. The Physical Plant, Student Housing 1, and illuminated Campus Sign at Avalon and Victoria are all served by SCE at 480V or 208V.

B. SYSTEM CHANGES UNDERWAY (APRIL 2017)

SCE supplies power to the core campus at 16.5kV via two overhead distribution circuits and two underground service laterals that terminate at the Central Plant 16.5kV service entrance PE ATS switchgear. The two SCE 16.5kV circuits are supplied from two different SCE distribution substations. Each SCE circuit is capable of supplying the entire campus load with an ultimate limit of approximately 9400kVA. However, the SCE 16.5kV distribution circuits supply multiple customers including the StubHub facility. SCE can only presently provide 4800kVA to the campus. The existing SCE PE ATS service switchgear is leased from SCE. The lease expires in late 2017. SCE has been requested to provide options regarding lease renewal or replacement.

Since 2017, the new 1,000kW, 4MWhr, Battery Storage System is installed and operational. The Battery Storage System will be connected to existing switch CP-CPHV5 with a 250kcmil feeder conductor size. The Battery Storage System is controlled by STEM, who will operate the battery system to reduce electric power peak throughout the day. The operation of the battery system is controlled by STEM based on an agreement with SCE.

The new 12kV, 250kcmil feeder installed for the Battery Storage System could also be used to supply power to new loads.

The new cooling tower replacement project was completed in 2017. This new project is supplied 480V power from the existing Central Plant 12kV unit substation, CPT1 and CPT2. It will result in a net increase in load when all three cooling tower cells are in operation.

The Central Plant 1,000kVA, 12kV–480V double-ended unit substation will be replaced as part of the 1000-ton electric chiller installation. Initially, two 1000-ton chillers will be installed, with a third 1000-ton chiller to follow in 2019. The chillers will increase electric power demand by 700kW each, or a total of 2100kW for all three chillers.

The new 91,000GSF Science Building began construction in 2017. The existing 12kV source feeder for the SAC buildings is connected to switch CP-CPHV5 and is sized to #2AWG, Cu. The cable installed from CP-CPHV5 will be removed. Two (2) new 250kcmil feeders will be installed from NSM-201HV1 and NSM-201HV2 to a new four-way SF6 switch. The new Science Building and CMS Buildings will be supplied from the new SF6 switch. The Science Building will result in an estimated net increase of up to 910kW based on 10W/sqft. SAC 100 is being demolished as part of the Science Building project and will result in a decrease of 100kVA or so.

The Student Housing Phase III project is in conceptual design phase and occupancy is planned for the Fall 2019 term. The project will include cooling for the dorm rooms. A 1,000kVA, 12kV-208Y/120V loop feed transformer will be installed and connected to SBS 100 HV5 or SBS 100 HV6. The new load is estimated at 43W/sqft, 306kW. This excludes cooling loads, which will be Central Plant connected.

Bld. ID	Building Name	GSF	Watts/SF	Peak Load kW	PV Peak Capacity (kW)	Net Peak Load with PV (kW)	To Remain/Demo
1	(SCC-1) SMALL COLLEGE COMPLEX 1	8,529	2.36	20	0	20	Demo
2	(SCC-2) SMALL COLLEGE COMPLEX 2	5,313	2.36	13	0	13	Demo
3	(SCC-3) SMALL COLLEGE COMPLEX 3	1,263	2.36	3	0	3	Demo
4	(SCC-4) SMALL COLLEGE COMPLEX 4	1,263	2.36	3	0	3	Demo
5	(SCC-5) SMALL COLLEGE COMPLEX 5	5,315	2.36	13	0	13	Demo
6	(SCC-6) SMALL COLLEGE COMPLEX 6	5,841	2.36	14	0	14	Demo
7	(SCC-7) SMALL COLLEGE COMPLEX 7	2,145	2.36	5	0	5	Demo
8	(SCC-8) SMALL COLLEGE COMPLEX 8	2,920	2.36	7	0	7	Demo
9	(SCC-9) SMALL COLLEGE COMPLEX 9	1,626	2.36	4	0	4	Demo
10	(SCC-10) SMALL COLLEGE COMPLEX 10	2,145	2.36	5	0	5	Demo
11	(SCC-11) SMALL COLLEGE COMPLEX 11	5,841	2.36	14	0	14	Demo
13	(SCC-13) SMALL COLLEGE COMPLEX 13	5,290	2.36	12	0	12	Demo
14	(COE) SCHOOL OF EDUCATION	26,433	2.36	62	0	62	Demo
61	(FH) FIELD HOUSE	13,650	0.90	17	0	17	Demo
71	(BLDG X) PUEBLO DOMINGUEZ SH-2	76,093	1.05	37	0	37	Demo
103	(SAC-3)SOUTH ACADEMIC COMPLEX 3	17,280	1.11	19	0	19	Demo
116	(EAC) EAST ACADEMIC COMPLEX	17,760	6.55	116	0	116	Demo
120	(CDC) CHILD DEVELOPMENT CENTER	4,320	6.06	26	0	26	Demo
121	(ITC) INFANT TODDLER CENTER	4,320	6.06	26	0	26	Demo
	VDC #1	N/A	N/A	43	0	43	Demo
	VDC #3	N/A	N/A	12	0	12	Demo
20	(LIB) LEO F. CAIN LIBRARY	152,006	1.15	175	0	175	To Remain
20	LIBRARY ADDITION	139,569	1.29	180	240	-60	To Remain
23	(WH) JAMES L WELCH HALL	179,952	1.21	218	240	-22	To Remain
25	(SHC) STUDENT HEALTH CENTER	20,046	1.85	37	0	37	To Remain
26	(LSU) LOKER STUDENT UNION NEW BUILDING	123,033	N/A	233	0	233	To Remain
26	(LSU) LOKER STUDENT UNION OLD BUILDING		N/A	261	0	261	To Remain
30	(SBS) SOCIAL/BEHAVIORAL SCIENCES	81,000	2.15	174	0	174	To Remain
40	(LCH) LACORTE HALL	70,331	3	176	240	-64	To Remain
45	(UT) UNIVERSITY THEATRE	25,201	3	70	0	70	To Remain
50	(NSM) NATURAL SCIENCES/MATHEMATICS	84,450	1.94	164	0	164	To Remain
52	SCIENCE & INNOVATION	91,000	10.00	910	240	670	To Remain
60	(GYM) GYMNASIUM	65,752	1.24	82	240	-158	To Remain
87	(CP) CENTRAL PLANT w/ ABSORPTION CHILLER	12,840	26.71	343	0	343	To Remain
102	(SAC-2)SOUTH ACADEMIC COMPLEX 2	15,940	1.11	18	0	18	To Remain
106	(EE) EXTENDED EDUCATION CENTER	24,619	3.25	79	0	79	To Remain
107	(CAMS) CA. ACADEMY OF MATH AND SCIENCE	31,667	3.05	113	0	113	To Remain
111	BASEBALL/SOFTBALL STORAGE	3,380	1.24	4	0	4	To Remain
107	(CAMS) CA. ACADEMY OF MATH AND SCIENCE	13,548	5.15	70	0	70	To Remain
	VELODROME SPORTS CENTER	N/A	N/A	318	0	318	To Remain
	TRACK & FIELD	N/A	N/A	174	0	174	To Remain
			TOTAL	**3360**	**1200**	**3070**	

TABLE 1. EXISTING BUILDINGS SERVED BY CORE CAMPUS 12KV SYSTEM

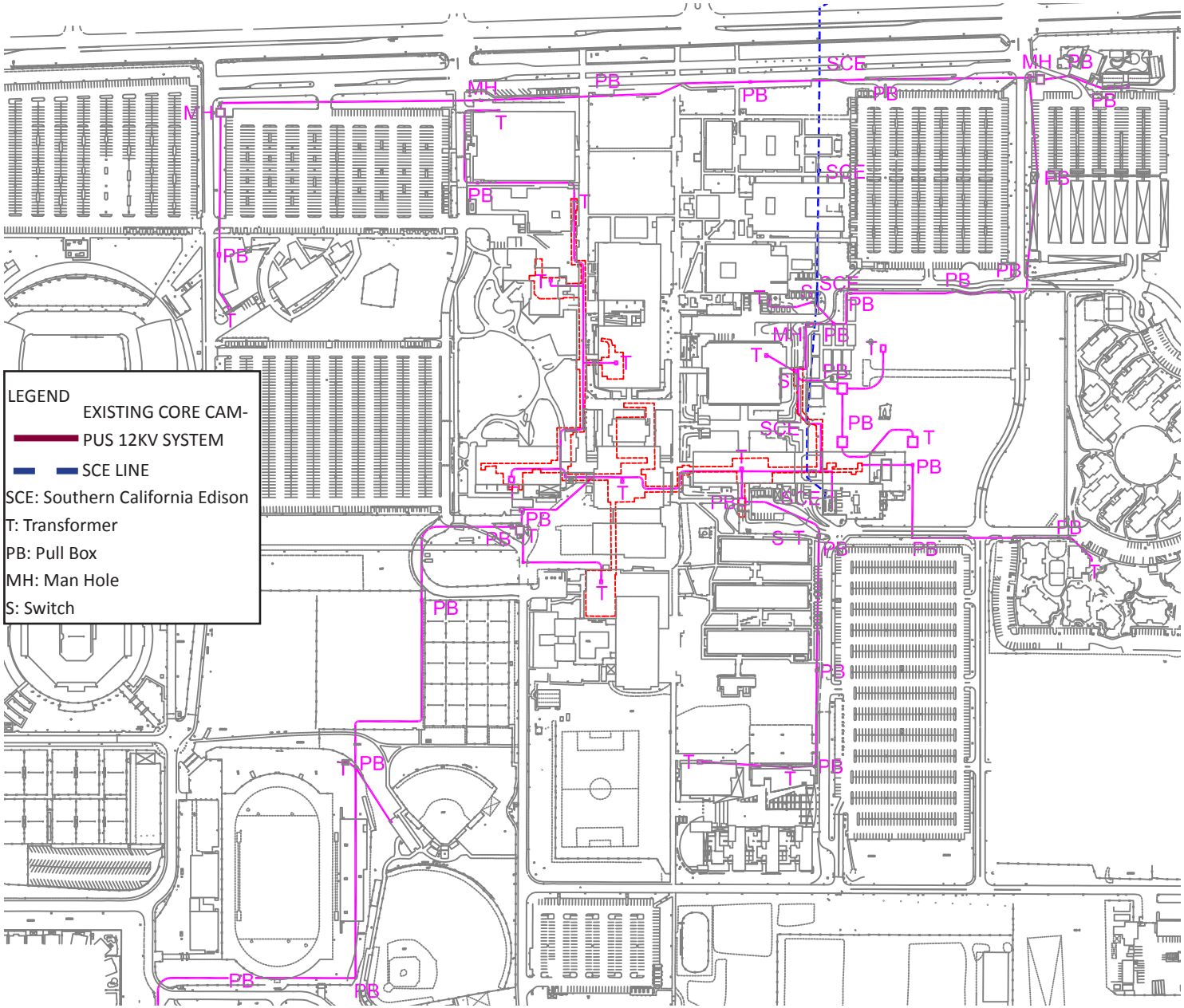


FIGURE 2. EXISTING CORE CAMPUS 12KV SYSTEM

C. LOAD GROWTH ASSOCIATED WITH MASTER PLAN

Table 2 summarizes the buildings being considered for development as part of the Master Plan. Table 2 shows the Core Campus buildings, GSF, kW demand per sqft, and estimated peak demand. Table 2 also includes peak demand if rooftop photovoltaic is installed on new buildings as required by CalGreen Building Code. A new electric service is required to supply the total load. The existing service transformers cannot supply the total load, and the space where the existing service equipment is installed is not adequate for the new larger transformers. Construction dates have been assigned to new buildings which is necessary to prepare a load growth estimate. Based on the estimate, a new campus service is required sometime between 2023 and 2025, if planned construction is completed according to the dates assigned. The load forecast should be updated when actual planned construction dates become available.

The UV electric load cannot be supplied from the existing or new electric service for the Core Campus if the SCE service voltage remains 16.5kV. The alternative to 16.5kV service is 66kV, which requires a larger substation area (115' x 160'), a 5-year planning and construction schedule, and major upfront investment.

Based on the addition of up to 1.4 million GSF of new buildings, net of any existing building load to be demolished, the long term electric power coincident peak demand to be supplied to campus load is estimated at 15,765kW.

The building electric power load diversity will typically result in a lower actual peak demand than is estimated. The non-coincident peak demand is estimated at 14,475kW using a factor of 0.9 to account for load variability. The estimates for W/GSF included in this study are based on empirical "real world" values for the local climate zone, and are adjusted. It is important to err on the conservative side when determining the "minimum" electric power service and distribution feeder size requirements because the planned infrastructure must support the next 40 years of campus operations and construction. The "extra" capacity provided as a result of the more conservative approach will allow for flexibility in design and future load growth. The new service should be designed and rated to allow for at least 40 years of load growth and changes.

One component of the new load is electric vehicle charging station loads. A typical Level 2 charger consumes 8kVA for 3-4 hours to fully charge a vehicle battery. Fast chargers presently consume 60kVA of power for 1-2 hours. The California Building Code, California Energy Code, and California Green Building Code all include requirements for residential and non-residential electric vehicle supply equipment (EVSE). At present a total of 6% of all new parking spaces must be designated as EVSE and include provisions for the electrical system capacity to install EVSE charging systems. The percentage of EVSE compliant parking spaces required has recently increased from 3% to 6%, which translates to a very large increase in electric power demand and capacity. This is a very good example of future load growth that did not exist five-years ago. The load estimates for parking structures in this study include up to 10% of all spaces as EVSE equipped. Future development in commuter transportation options, including ride sharing and autonomous vehicles, as well as bi-directional vehicle charging equipment require designers to prepare for flexibility in their electrical system designs and electrical load estimation.

The load estimate in Table 2 and Table 3 includes a reduction in daytime peak demand due to photovoltaic (PV) produced power. Refer to Appendix 4 for details regarding the Photovoltaic Concept for the Core Campus.

D. MEETING LONG TERM ELECTRIC POWER LOADS WITHIN THE CORE CAMPUS

The existing campus electric service is 247-years old. The existing service design and capacity included two 5000kVA transformers, each one capable of supplying the entire campus load. The 12kV distribution system includes a 1200A main-tie-main switchgear and two separate 12kV loop feed distribution feeders. The design provides a high level of reliability that should be maintained as the system is renovated and new loads are added. The future development and expansion of the Core Campus electric infrastructure envisioned in this study maintains and expands upon the original design approach. Possible scenarios to accommodate the increase in campus electric power capacity are summarized below.

1) Initiate a Method of Service (MOS) with SCE immediately. The MOS will include both 66kV and 16.5kV service options. SCE will provide details for installation, schedule, upfront costs paid by the customer, taxes, and added facilities charges.
2) Continue to utilize the existing SCE 16.5kV service and establish the maximum existing service capacity. Begin planning for a new higher capacity substation with SCE. The ultimate capacity of the new substation should be on the order of 15,000kVA. Establish the schedule to construct and energize the new service substation based on the timing for construction and energization of new Core Campus loads and SCE requirements for planning and construction. Given the information available regarding plans for new facilities, a new substation may be required by 2023-2025. Planning, design, and funding should start immediately. SCE will require up to four-years to plan, construct, and energize. The new Campus Core substation design must be coordinated with the SCE design and planning for the UV area.
3) Request a 66kV substation option in the SCE MOS. The substation will require extension of the existing SCE 66kV overhead lines located on

Building Name	GSF	Watts/SF	Peak Load (kW)	PV Peak Capacity (kW)	Net Peak Load with PV (kW)	Year Energized
Academic	158,572	3.00	476	176	300	2035
Admin	98,500	3.00	296	110	185	2035
Black Box Theatre	7,640	2.00	15	0	15	2035
Academic	68,000	3.00	204	86	118	2035
Rec Center	148,400	2.00	297	410	-113	2023
Student Apartments	414,403	4.00	1658	338	1320	2022
Incubator	57,128	5.00	286	65	220	2022
I&I	136,050	7.00	952	83	870	2020
Academic/Admin	105,850	3.00	318	100	218	2023
Student Union Expansion	85,000	5.00	425	86	339	2023
Academic/Admin	94,360	3.00	283	121	163	2030
Academic/Admin	116,250	4.00	465	114	351	2030
Academic/Admin	104,020	4.00	416	121	296	2030
Plant Operations (Central Plant Phase 1, 2-1000T CH)	6,450	N/A	1400	0	1400	2019
Plant Operations (Central Plant Phase 2, 1-1000T CH)		N/A	700	0	700	2019
Satellite Central Plant (400 Ton)	5,500	N/A	400	0	400	2023
Facilities Services Complex	46,900	10.00	469	320	149	2030
Child Care	17,970	3.00	54	123	-69	2026
Fab Lab Garage	6,916	5.00	35	47	-13	2030
New Science Building (NCSI)	91,000	10.00	910	240	670	2019
Residence Hall: Phase III Housing (1)	83,332	3.00	250	0	250	2019
Residence Hall: Phase III Food Service & Activity Space (2)	7,027	8.00	56	0	56	2019
Residence Hall: Phase IV Housing (4)	56,700	3.00	170	0	170	2021
Residence Hall: Phase IV Housing (5)	56,700	3.00	170	0	170	2021
Surface Parking (323 Spaces) 20 EV Spaces	113,140	1.41	160	0	160	2022
Parking Structure (3114 Spaces) 187 EV Spaces	1,012,480	1.58	1596	1557	39	2025
Parking Structure (3677 Spaces) 221 EV Spaces	1,195,100	1.56	1868	1577	291	2030
Parking Structure (683 Spaces) 41 EV Spaces	239,020	1.79	428	0	428	2021
Surface Parking (45 Spaces) 3 EV Spaces	15,840	1.52	24	0	24	2020
		TOTAL	**14780**	**5673**	**9107**	

TABLE 2. NEW BUILDINGS SERVED BY CORE CAMPUS 12KV SYSTEM

Building ID	Building Name	GSF	Watts/SF	Connected Load (kW)	Demand Factor	Peak Demand (kW)	Peak Coincidence Demand Factor	Adjusted Peak (kW)	PV Peak Capacity (kW)	Net Peak Load wth PV (kW)
20	(LIB) LEO F. CAIN LIBRARY	152,006	1.15	175	1.00	175	1.00	175	0	175
20	LIBRARY ADDITION	139,569	1.29	180	1.00	180	1.00	180	240	180
23	(WH) JAMES L WELCH HALL	179,952	1.85	218	1.00	218	1.00	218	240	218
25	(SHC) STUDENT HEALTH CENTER	20,046	1.85	37	1.00	37	1.00	37	0	37
26	(LSU) LOKER STUDENT UNION NEW BUILDING	123,033	N/A	233	1.00	233	1.00	233	0	233
26	(LSU) LOKER STUDENT UNION OLD BUILDING		N/A	261	1.00	261	1.00	261	0	261
30	(SBS) SOCIAL/BEHAVIORAL SCIENCES	81,000	2.15	174	1.00	174	1.00	174	0	174
40	(LCH) LACORTE HALL	70,331	2.50	176	1.00	176	1.00	176	240	176
45	(UT) UNIVERSITY THEATRE	25,201	2.77	70	1.00	70	1.00	70	0	70
50	(NSM) NATURAL SCIENCES/MATHEMATICS	84,450	1.94	164	1.00	164	1.00	164	0	164
52	SCIENCE & INNOVATION	91,000	10.00	910	0.90	819	0.90	737	240	737
60	(GYM) GYMNASIUM	65,752	1.24	82	1.00	82	1.00	82	240	82
87	(CP) CENTRAL PLANT	12,840	26.71	343	1.00	343	1.00	343	0	343
106	(EE) EXTENDED EDUCATION CENTER	24,619	3.21	79	1.00	79	1.00	79	0	79
107	(CAMS) CA. ACADEMY OF MATH AND SCIENCE	31,667	3.57	113	1.00	113	1.00	113	0	113
111	BASEBALL/SOFTBALL STORAGE	3,380	1.24	4	1.00	4	1.00	4	0	4
107	(CAMS) CA. ACADEMY OF MATH AND SCIENCE	13,548	5.15	70	1.00	70	1.00	70	0	70
	VELODROME SPORTS CENTER	N/A	N/A	318	1.00	318	1.00	318	0	318
	TRACK & FIELD	N/A	N/A	174	1.00	174	1.00	174	0	174
A	Academic	198,215	3.00	476	0.90	428	0.90	385	176	210
B	Admin	105,440	3.00	296	0.90	266	0.90	239	110	129
C	Black Box Theatre	7,640	2.00	15	0.90	14	0.90	12	0	12
D	Academic	85,000	3.00	204	0.90	184	0.90	165	86	79
E	Rec Center	151,148	2.00	297	0.90	267	0.90	240	410	-169
F	Student Apartments	414,403	5.00	1,658	0.90	1,492	0.90	1,343	338	1,005
I	Incubator	71,410	5.00	286	0.90	257	0.90	231	65	166
J	I&I	111,310	7.00	952	0.90	857	0.90	771	83	689
K	Academic/Admin	99,570	3.00	318	0.90	286	0.90	257	100	157
L	Student Union Expansion	85,000	5.00	425	0.90	383	0.90	344	86	258
M	Academic/Admin	128,185	3.00	283	0.90	255	0.90	229	121	109
N	Academic/Admin	123,770	4.00	465	0.90	419	0.90	377	114	263
O	Academic/Admin	130,025	4.00	416	0.90	374	0.90	337	121	216
P	Plant Operations (Central Plant Phase 1, 2-1000T CH)	5,170	N/A	1,400	0.90	1,260	0.90	1,134	0	1,134
P	Plant Operations (Central Plant Phase 2, 1-1000T CH)	2,000	N/A	700	0.90	630	0.90	567	0	567
Q	Satellite Central Plant (400 Ton)	N/A	N/A	400	0.90	360	0.90	324	0	324
R	Facilities Services Complex	46,900	10.00	469	0.90	422	0.90	380	320	149
RH1	Residence Hall: Phase III Housing (1)	83,332	3.00	250	0.90	225	0.90	202	0	202
RH2	Residence Hall: Phase III Food Service & Activity Space (2)	7,027	8.00	56	0.90	51	0.90	46	0	46
RH5	Residence Hall: Phase IV Housing (4)	56,700	3.00	170	0.90	153	0.90	138	0	138
RH6	Residence Hall: Phase IV Housing (5)	56,700	3.00	170	0.90	153	0.90	138	0	138
V	Child Care	17,970	3.00	54	0.90	49	0.90	44	123	-69
W	Fab Lab Garage	6,916	5.00	35	0.90	31	0.90	28	47	-13
Lot 3	Surface Parking (323 Spaces) 20 EV Spaces	100,700	1.41	160	0.80	128	0.90	115	0	115
Lot 4A & 4B	Parking Structure (3677 Spaces) 221 EV Spaces	956,116	1.56	1,868	0.80	1,494	0.90	1,345	1577	-232
Lot 6A & 6B	Parking Structure (3114 Spaces) 187 EV Spaces	1,012,508	1.58	1,596	0.80	1,277	0.90	1,149	1557	-408
Small Lot North of Welch Hall	Surface Parking (45 Spaces) 3 EV Spaces	15,840	1.52	24	0.80	19	0.90	17	0	17
South Surface	Parking Structure (683 Spaces) 41 EV Spaces	919,060	1.79	428	0.80	342	0.90	308	0	308
			TOTAL	**17,650**		**15,765**		**14,475**		**9,149**

TABLE 3. ALL BUILDINGS SERVED BY CORE CAMPUS, FINAL PLAN

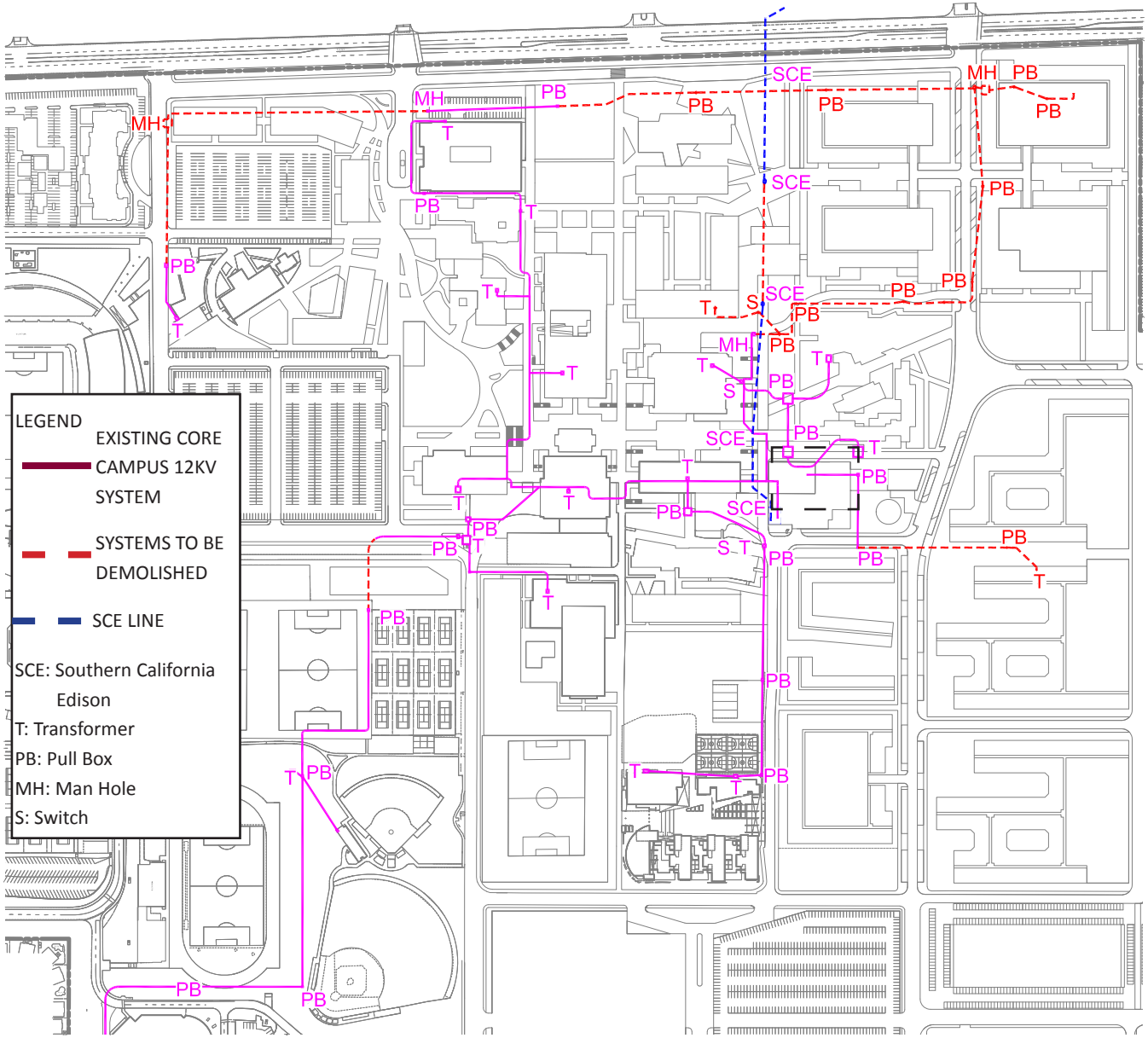


FIGURE 3. EXISTING 12KV POWER DISTRIBUTION LAYOUT, DEMO PLAN

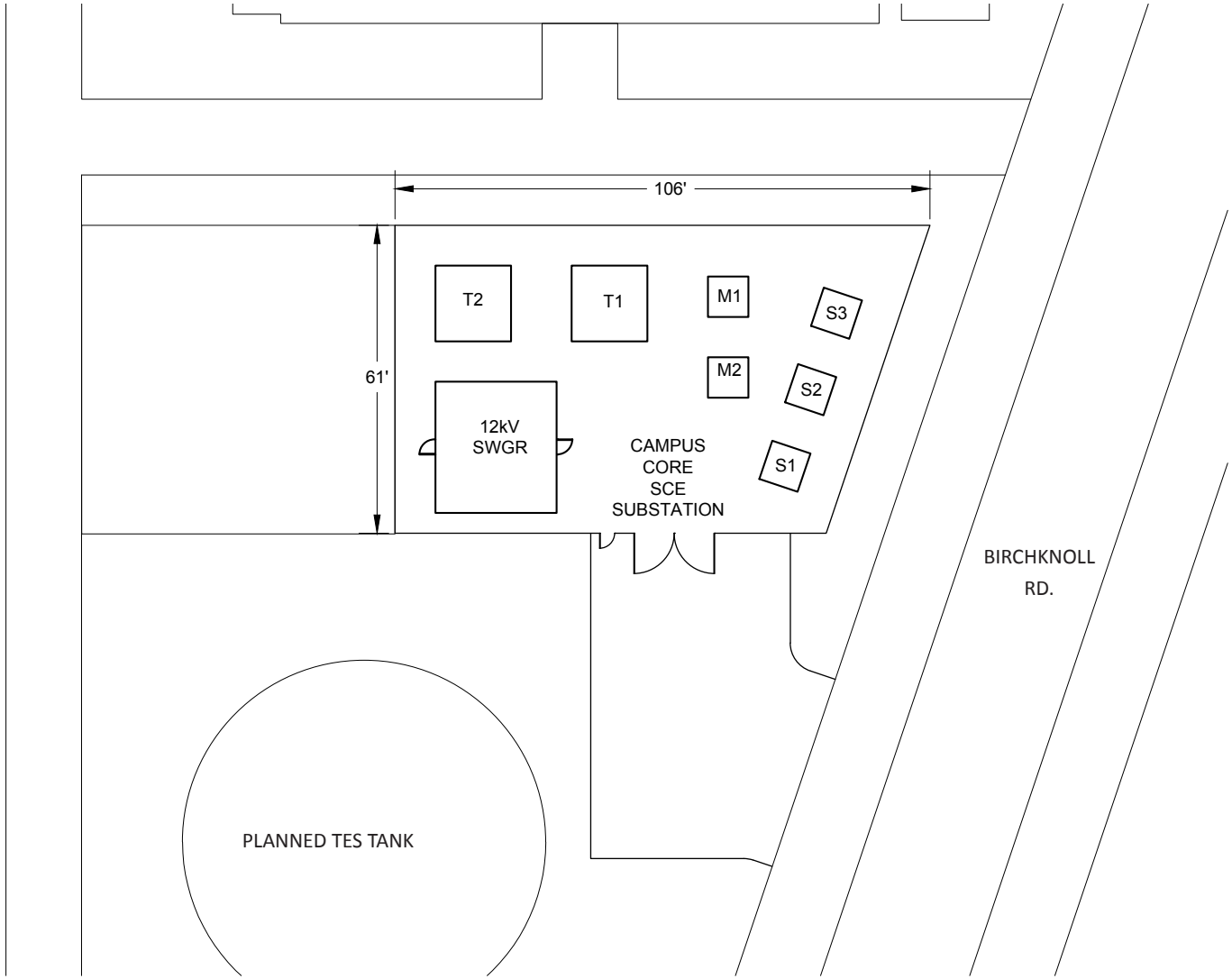


FIGURE 4. SCE NEW SUBSTATION

Victoria Street to the new 66kV campus substation location. A minimum area for the substation is 115 feet-by-160 feet. Refer to Figure 8 and Figure 9 included in Part B: University Village Summary of Appendix B3 for possible 66kV line route and substation location.

4) Provide new feeders, sized at 250kcmil minimum, for the new Science Building, new Student Housing complex, and new Chiller Plant. The 250kcmil conductor size is a minimum size for a loop feeder.

5) As load increases, and until a new Core Campus substation is energized, rebalance the loads between the two 12kV 5000kVA transformers and main breakers to avoid an overload of either 5000kVA transformer. Install meters to continuously monitor the load at the main 12kV switchgear. Establish the maximum load SCE can provide from the existing service.

6) Monitor the 12kV feeder loads. Rebalance the feeders by switching building loads between the 12kV feeders to avoid an overload of an individual feeder. Install meters to continuously monitor the feeder loads. Replace the existing @2AWG loop feed cables with 250kcmil.

7) The new 16.5kVSCE Core Campus substation will be located northeast of the proposed new TES tank. A concept design for the new substation is shown in Figure 4. The final design must include SCE requirements. The new substation will include SCE 16.5kV distribution equipment maintained and operated by SCE. The substation will also include campus owned transformers and 12kV switchgear. The maximum capacity of the substation should be 15,000kVA, based on the Master Plan load estimate. The load estimate basis excludes the mitigating effects of campus installed generation, such as PV or fuel cells, and also energy storage, such as batteries, which will reduce the peak load when in operation. SCE will need to confirm the ultimate capacity available for the new substation. The new substation will include Rule 21 provisions for customer owned generation.

8) The new 12kV distribution system will consist of four loop feed circuits, requiring eight total feeders. Two existing loop feeders with 250kcmil cable will need to be upgraded overtime to replace some #2AWG cable in order to provide 310A, or 6400kVA, of full capacity of the loop. The existing loop feeder will also need to have some existing switches replaced in order to address configuration issues in the future. Two new loop feeders will also be required to supply the new loads. One of the new loop feeders can be connected at the existing 12kV main switchgear using spare breakers HV3 and HV4. The other new loop feeder will be connected to the new 12kV substation switchgear. The existing 12kV main switchgear located in the Central Plant will be reconnected and supplied from the new service with parallel phase conductors capable of supplying 1200A continuously. The two new loop feeder circuits should be 500kcmil cable to provide for future load growth and back-up feeder capability to cross connect to the two existing 250kcmil feeders. The cross connect capability will be utilized during modification of the infrastructure, when sections of existing duct bank are removed as part of demolition for site preparation. Power system studies will be required and existing equipment short circuit interrupting ratings will need to be checked versus the new higher short circuit duty. The existing SCE service equipment will be demolished after the new substation is energized with the Core Campus loads.

9) Include electric power infrastructure costs for demolition and replacement in the cost for each building project. The costs should include all duct banks, manholes, loop feed cable, 12kV sectionalizing switches, and building service cable and transformers that are associated with the work necessary to maintain continuity of service to existing campus loads, connect new buildings and loop feeders, and make provisions for the ultimate system configuration. This will add significant costs to each project, so project feasibility studies should include scope and costs for infrastructure installation and replacement.

10) Meet with SCE to define Rule 21 requirements and the location for a Utility Line Disconnect (ULD) for all utility interactive inverters associated with energy sources that operate in parallel with the utility. It is preferred to have a ULD at each location where an inverter is installed rather than have the campus main service designated as the ULD.

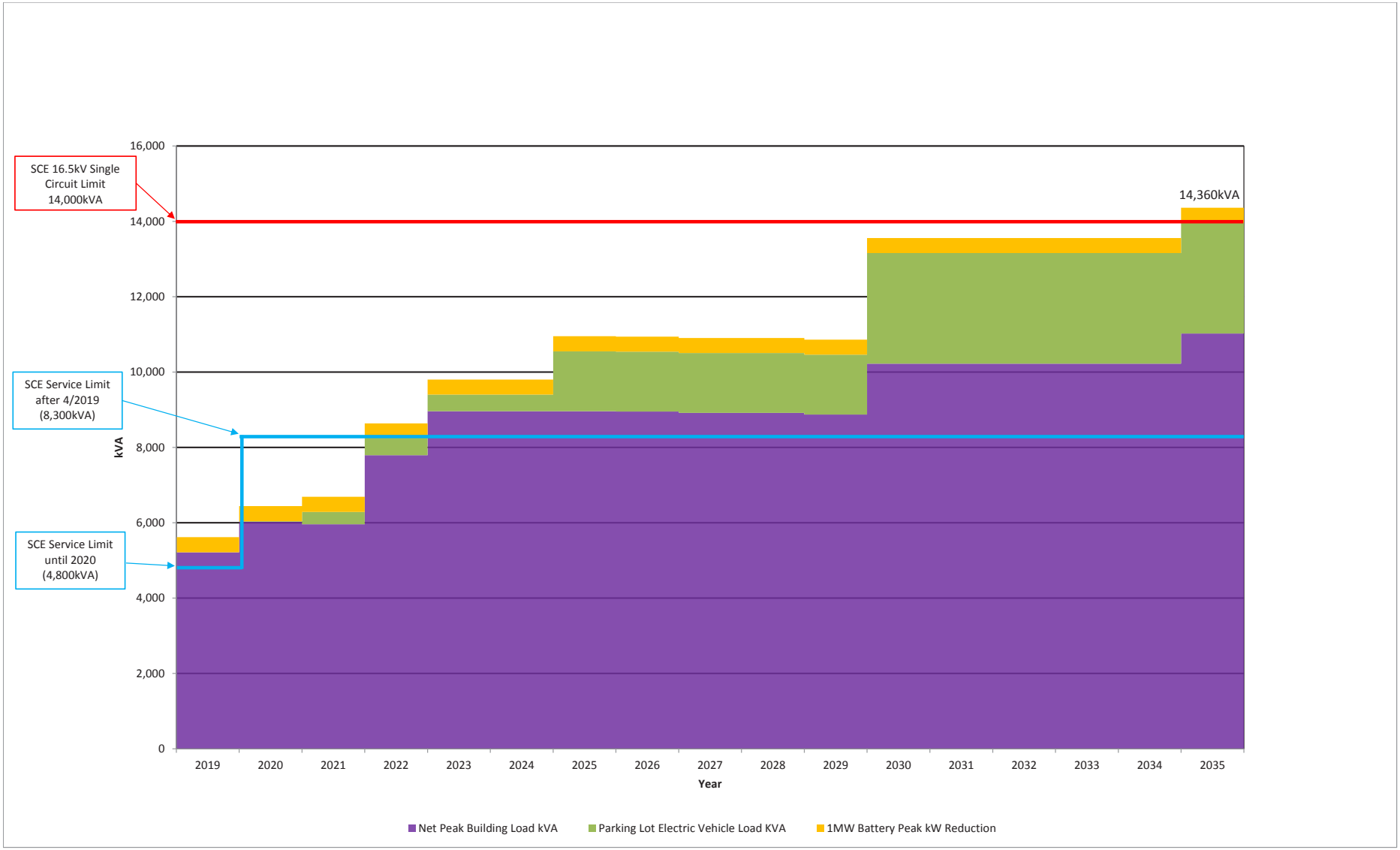
11) The campus should review the requirements for electric vehicle supply equipment (EVSE) and establish compliance objectives. The 6% mandatory requirement established by the California Codes and Regulations is applicable to all new parking lots and parking structures. The total power capacity required to supply 6% of the 7,842, or so, new parking spaces, or 515 EVSE required spaces, is 3,764kVA. This is roughly 25% of the estimated peak demand for the new construction included in the Master Plan.

12) Develop a phasing plan, budget cost estimate, and a capital project request for each phase of construction for new infrastructure and new campus SCE service substation.

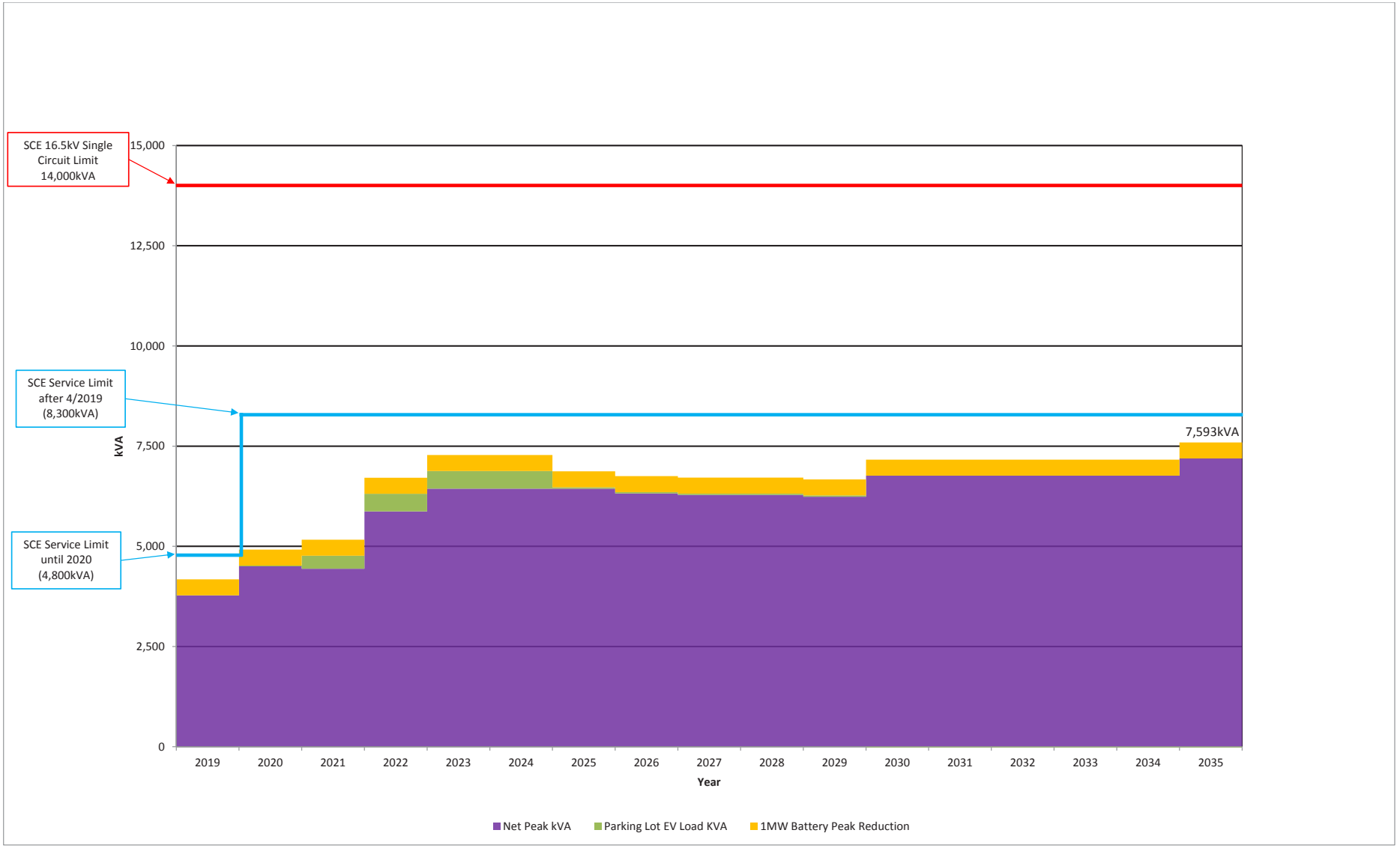
13) Graph 1 and Graph 2 depict the Core Campus peak load profile. Graph 1 is the Core Campus load without PV, and Graph 2 is the Core Campus load with PV. The peak load reduction due to battery operation is also shown.

14) Evaluate Rule 18 compliance requirements for sub-metering of third party loads. This issue is of particular importance if a 66kV substation is constructed to supply power to both the Core Campus and University Village loads.

15) Evaluate future measures to reduce the Core Campus peak demand such as photovoltaics, battery storage, thermal energy storage, energy savings building retrofits, and load control. Prepare a study of measures that could be implemented in order to reduce the peak demand “seen” by SCE which may result in lower capital costs for a new SCE service substation.



GRAPH 1. CSUDH CORE CAMPUS LOAD PROFILE WITHOUT PV



GRAPH 2.CSUDH CORE CAMPUS LOAD PROFILE WITH PV

PART B: UNIVERSITY VILLAGE - ELECTRIC POWER INFRASTRUCTURE

A. LOAD GROWTH ASSOCIATED WITH MASTER PLAN

The University Village is subdivided into building parcels that are projected to be developed over a 15-year time period. The planned development of the University Village consisting of 1.7 million GSF of parking structures, 2.5 million GSF of multi-family residential units, 94,000 GSF of retail, 390,000 GSF of apartments, and 572,000GSF of campus business park buildings. Table 4 includes the estimated electric power demand associated with each occupancy type for each parcel with and without photovoltaics. The total estimated peak load for the University Village is 16,185kVA or 3W/GSF. Electric vehicle EVSE loads are estimated at 3,545kVA and are included in the total. Graphs 3 and 4 show the load profile for the University Village with and without photovoltaic power. Provisions for photovoltaic power are now included in the Title 24 Energy Code, however, the amount of photovoltaics that could be installed is variable.

B. ELECTRIC POWER SERVICE OPTIONS FOR THE UNIVERSITY VILLAGE

Electric power for the University Village development can be provided in several ways as follows:

1) Supply power from a new upgraded SCE substation that also would supply power to the Core Campus with the infrastructure owned and operated by the campus. A consolidated single substation would require 66kV service and a 115 foot-by-160 foot substation. Rule 18 compliant metering would be required. Refer to Figures 8 and 9 for possible SCE 66kV line extensions and a new "campus" 66kV substation location.

2) Supply power to the entire University Village from an SCE operated and maintained underground 16.5kV distribution system, with up to four 16.5kV circuits configured in two loops.

3) Supply power to the University Village area loads from a combination of new SCE Core Campus substation and campus infrastructure and new SCE operated and maintained infrastructure. The capacity of the new SCE Core Campus substation is limited and could not accommodate the University Village loads. The advantages and disadvantages of each option for supplying power to the University Village would be considered as part of the SCE Method of Service (MOS) study process to inform the decision making process. The SCE MOS is the first step in the process.

4) The existing campus Phase 1 Housing project and existing Operations Buildings are presently located in the University Village and are supplied from separate SCE services. Both of these occupancies will be demolished, however the precedence for SCE service of the University Village of the campus is important because it establishes an SCE presence on campus, which is covered under California Public Utilities Commission (CPUC) Rule 16 for line extensions on private property. SCE has the option to install, operate, maintain, and meter such line extensions and provide service equipment to customer owned occupancies requiring multiple meters. SCE is also providing power to a privately owned parcel located on the northeast corner of the University Village that is supplied from the same distribution circuit that supplies the Phase 1 Housing. This SCE underground feeder may require relocation based on the proposed development and building plans for the University Village. SCE will require a "Global Easement" and will contract for new services with the property owner, or State of California.

5) The new 16.5kV SCE substation required for the Core Campus will be supplied from SCE 16.5kV distribution circuits. A dedicated distribution circuit capacity limit for a 16.5kV circuit is roughly 14,000kVA. Based on the load forecast for the Core Campus, there is no spare or excess capacity to supply University Village loads. A new 66kV service would be required to supply both the Core Campus and the University Village. The advantage of a 66kV service is that there is a 20% energy cost savings. However, the Core Campus is a Direct Access customer and will want to maintain its Direct Access status. The savings at 66kV will be reduced as a result of remaining a Direct Access customer. The disadvantage of 66kV service is the higher first cost and SCE added facilities charges. SCE would need to prepare a MOS study for both 16.5kV and 66kV service options to better inform the options, costs, design, and construction schedules.

6) An underground 16.5kV distribution system that is operated and maintained by SCE is feasible. The site plan shown in Figure 5 is based on SCE operated and maintained service. There are many advantages to this approach including:

   a. The cost for SCE cable and equipment is largely offset by new service credits, which will reduce the project first costs. SCE installs and maintains the cable, switches, and building service transformers under this scenario.

   b. Individual occupancies can be separately metered by SCE reducing the cost and burden for campus installed metering systems and costs for accounting, billing, customer relations, and collections.

   c. The campus avoids the first cost for installation of cable and equipment, as well as maintenance and operations, metering systems and billing, trouble calls and added personnel costs.

7) CPUC Rule 18, Part E requires all separate premises to be individually metered. A customer is prohibited from the re-sale of electric energy, unless a utility grade metering system is installed. However, none of the costs associated with metering and billing can be charged to the end user. For the University Village, maintenance of a campus owned metering system would be a significant cost for both labor and operations and on-going financial burden. For this reason, an SCE operated and maintained distribution system with SCE meters is recommended.

8) The site distribution plan shown in Figure 5 is relevant and applicable to either an SCE operated system or a campus operated system. The main considerations are:

   a. First Cost. The customer is responsible to install underground structures. The developer or the campus must pay for duct banks, manholes, and equipment pads, regardless if SCE or campus operated. The overall first cost including cable and equipment is lower if SCE service credits for new load can be applied.

   b. 66kV vs. 16.5kV. SCE will need to complete a Method of Service Study in order to provide a cost estimate and schedule for service options. A location for a 66kV substation is shown in Figure 8 and Figure 9. The campus should initiate discussions with SCE as soon as possible to begin a Method of Service Study for both the Core Campus and the University Village. SCE will charge a significant upfront fee for the MOS.

   c. Metering. The University Village will include thousands of occupancies. How are those occupancies to be metered and charged for energy use? Installation of meters by SCE is the better option for many reasons.

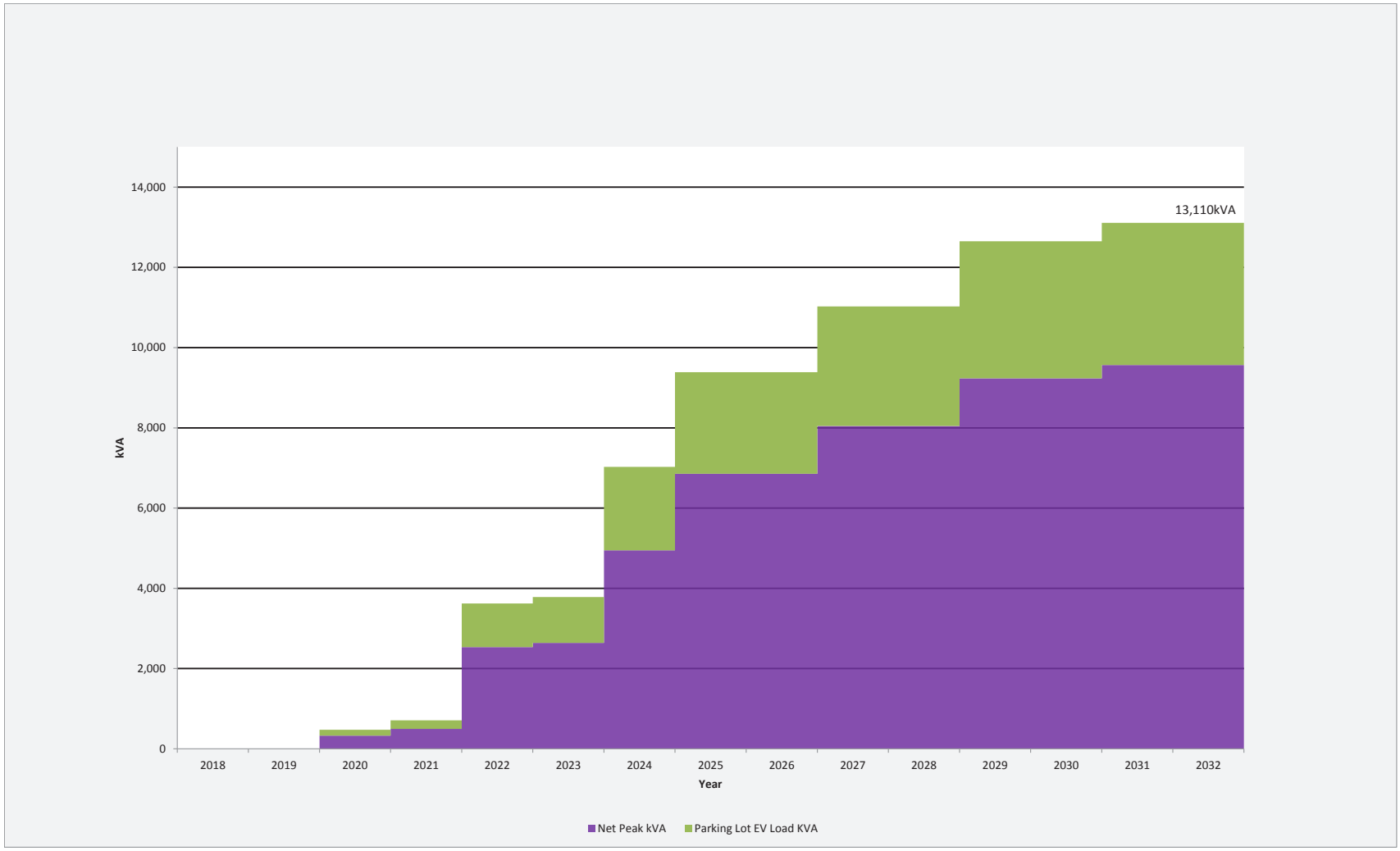
Parcel	Building Name	Year Energized	GSF	Watts/SF	Peak Load (kW)	Demand Factor	Peak Demand (kW)	Peak Coincidence Demand Factor	Adjusted Peak (kW)	PV Peak Capacity (kW)	Net Peak Load with PV (kW)	Year Energized
1-A	Multi-Family Rental	2022	316,595	4.00	1,026	0.9	923	0.9	831	241	949	2022
	Retail	2022	16,445	12.30	164	0.9	147	0.9	133			2022
	Parking Structure	2022	223,200	2.22	494	0.9	445	0.9	400	241	253	2022
1-B	Multi-Family Rental	2024	330,840	4.00	1,072	0.9	965	0.9	868	272	1,005	2024
	Retail	2024	20,630	12.30	206	0.9	185	0.9	166			2024
	Parking Structure	2024	223,200	2.22	494	0.9	445	0.9	400	241	253	2024
3-B	Faculty Apartments	2025	389,556	4.00	1,262	0.9	1,136	0.9	1,022	437	825	2025
4-A	Multi-Family Rental	2022	292,650	4.00	948	0.9	853	0.9	768	241	883	2022
	Retail	2022	17,695	12.30	176	0.9	159	0.9	143			2022
	Parking Structure	2022	223,200	2.22	494	0.9	445	0.9	400	241	253	2022
4-B	Multi-Family Rental	2024	363,751	4.00	1,179	0.9	1,061	0.9	955	320	1,252	2024
	Retail	2024	39,495	12.30	393	0.9	354	0.9	319			2024
	Parking Structure	2024	313,200	2.11	661	0.9	595	0.9	535	341	320	2024
5-A	Multi-Family Rental	2025	337,804	4.00	1,094	0.9	985	0.9	887	379	716	2025
	Parking Structure	2025	256,080	2.17	555	0.9	500	0.9	450	417	139	2025
5-B	Multi-Family Rental	2027	453,168	4.00	1,468	0.9	1,321	0.9	1,189	510	959	2027
	Parking Structure	2027	256,080	2.17	555	0.9	500	0.9	450	417	139	2027
5-C	Multi-Family Rental	2029	453,260	4.00	1,469	0.9	1,322	0.9	1,190	510	959	2029
	Parking Structure	2029	246,480	2.18	537	0.9	483	0.9	435	403	134	2029
6-A	Business Park	2020	86,400	2.36	204	0.9	184	0.9	165	389	-97	2020
	Surface Parking	2020			88	0.9	79	0.9	71			2020
	Business Park	2020	86,400	2.36	204	0.9	184	0.9	165	1,168	-467	2020
	Surface Parking	2020			88	0.9	79	0.9	71			2020
	Business Park	2021	86,400	2.36	204	0.9	184	0.9	165			2021
	Surface Parking	2021			88	0.9	79	0.9	71			2021
	Business Park	2022	86,400	2.36	204	0.9	184	0.9	165			2022
	Surface Parking	2022			88	0.9	79	0.9	71			2022
6-B	Business Park	2031	86,400	2.36	204	0.9	184	0.9	165	389	-113	2031
	Surface Parking	2031			72	0.9	65	0.9	58			2031
	Business Park	2023	54,000	2.36	127	0.9	115	0.9	103	389	-190	2023
	Surface Parking	2023			72	0.9	65	0.9	58			2023
7-A	Business Park	2031	86,400	2.36	204	0.9	184	0.9	165	389	-97	2031
	Surface Parking	2031			88	0.9	79	0.9	71			2031
				TOTAL	**16,185**		**14,567**		**13,110**	**7,935**	**8,074**	

TABLE 4. UNIVERSITY VILLAGE LOAD FORECAST WITH AND WITHOUT PHOTOVOLTAIC POWER

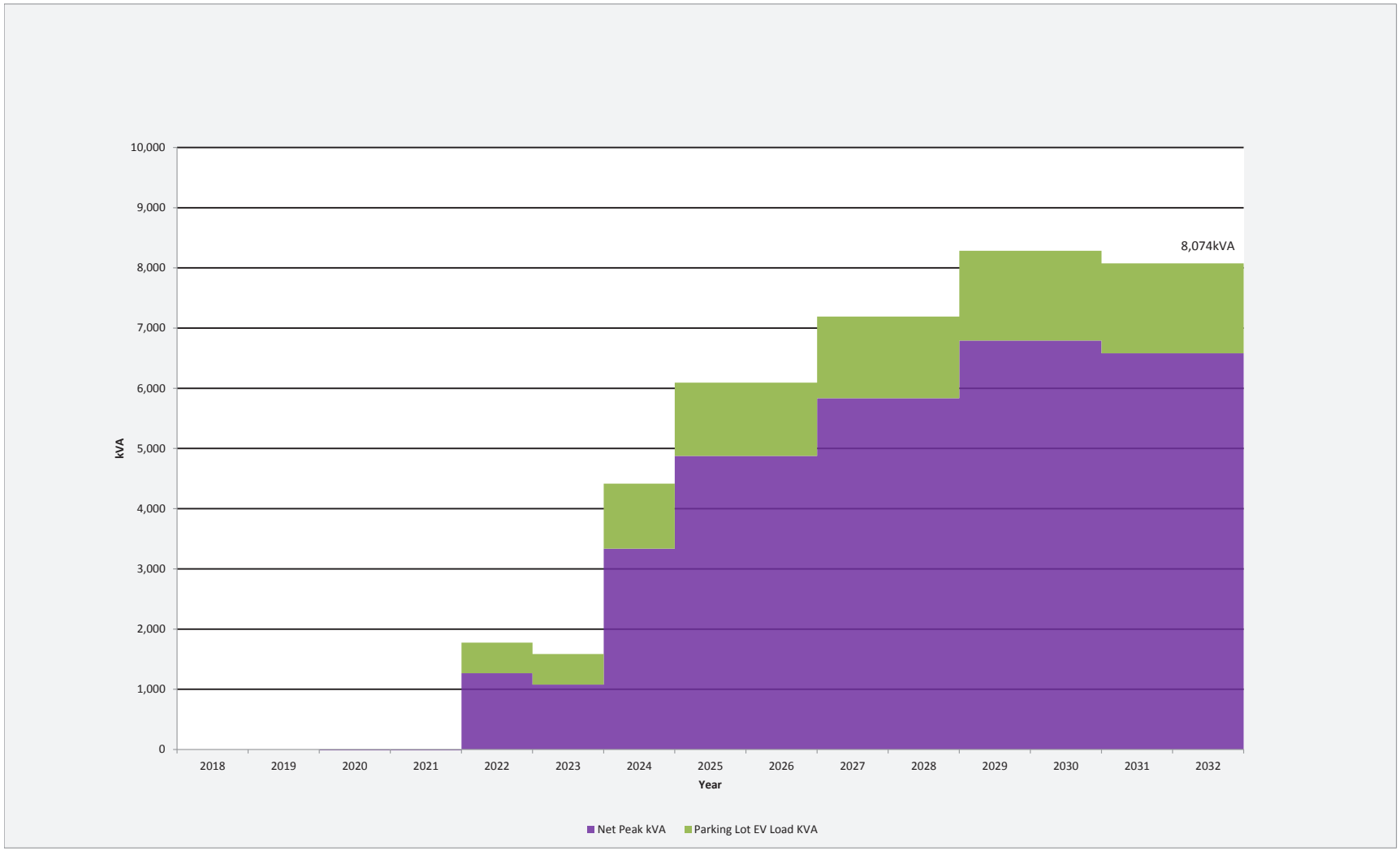
C. EXISTING 12KV POWER DEMOLITION AND RELOCATION

The Student Housing SH-1 SCE 12kV source duct bank also supplies power to the commercial buildings located at the northeast corner by Central Avenue and Victoria Street. The University Village development will need to be coordinated with the existing SCE underground circuit. The Student Housing SH-2 is supplied from the campus 12kV via Central Plant. The duct bank and equipment associated with SH-2 will be demolished.

The Facilities Services (FS) complex is supplied power by SCE at 480V. The SCE service lateral located on University Drive will be demolished when the FS building is vacated.



GRAPH 3.CSUDH UNIVERSITY VILLAGE LOAD PROFILE WITHOUT PV



GRAPH 4.CSUDH UNIVERSITY VILLAGE LOAD PROFILE WITH PV

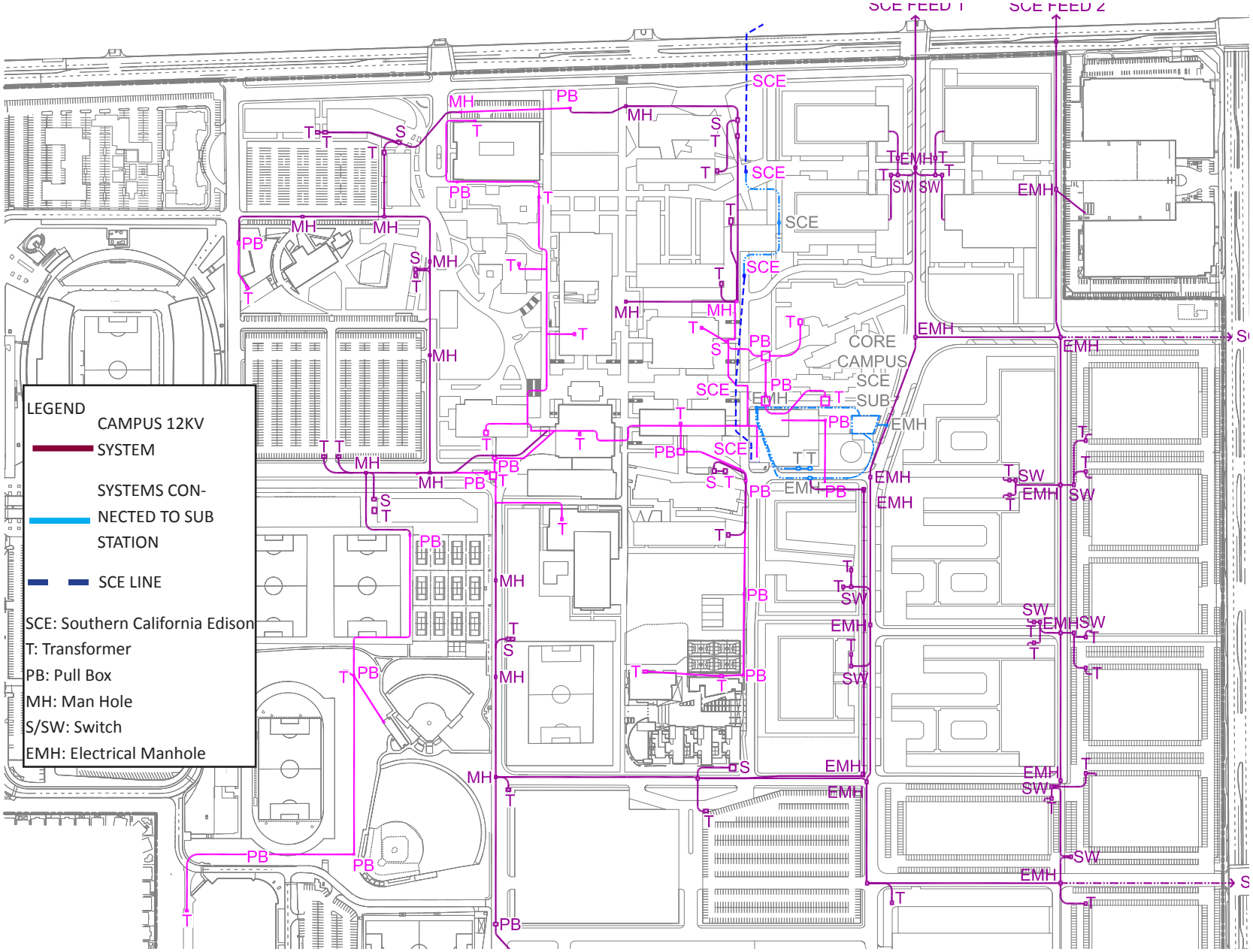


FIGURE 5. ELECTRIC POWER SITE DISTRIBUTION PLAN

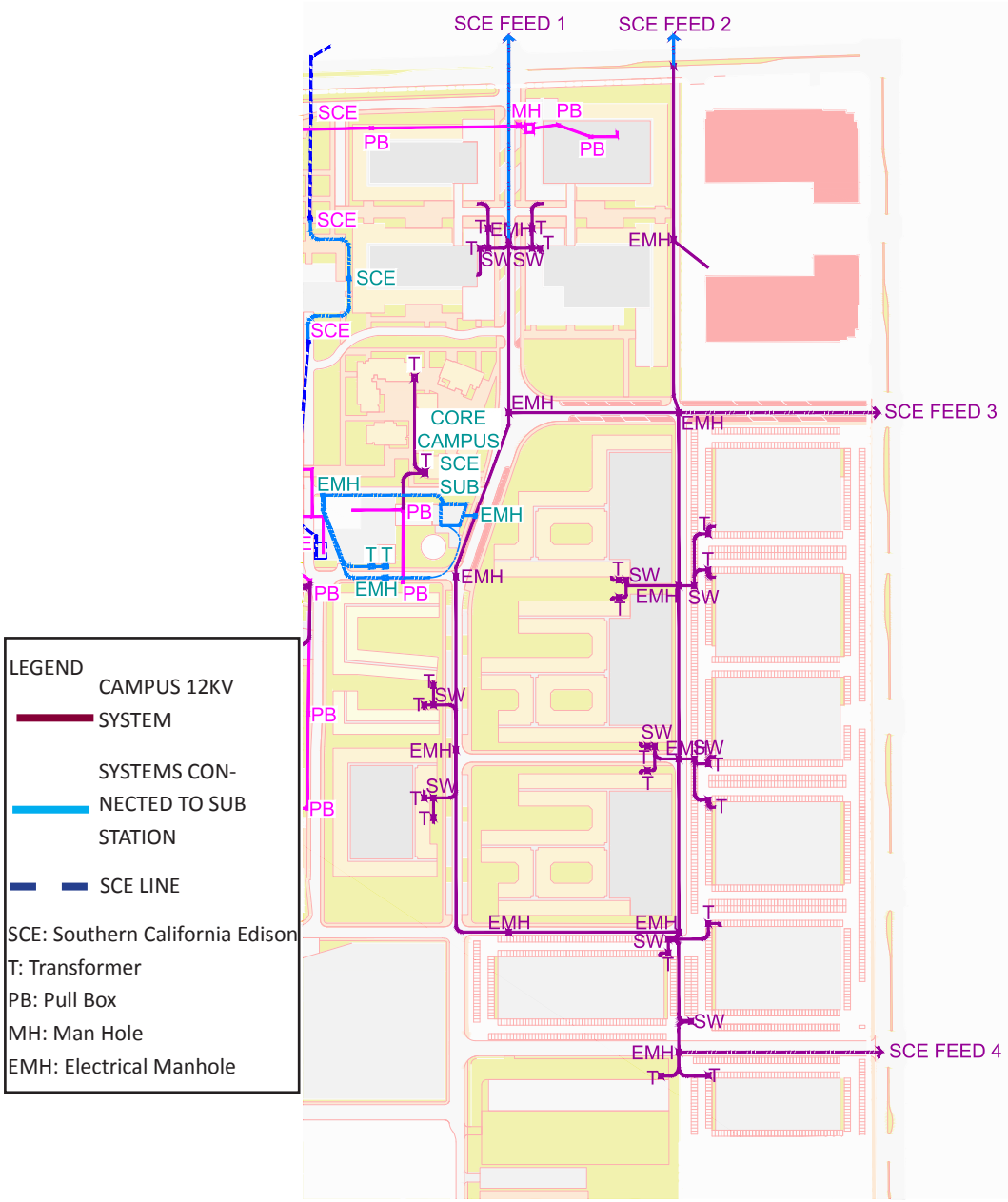


FIGURE 6. UNIVERSITY VILLAGE ELECTRIC POWER SITE DISTRIBUTION PLAN

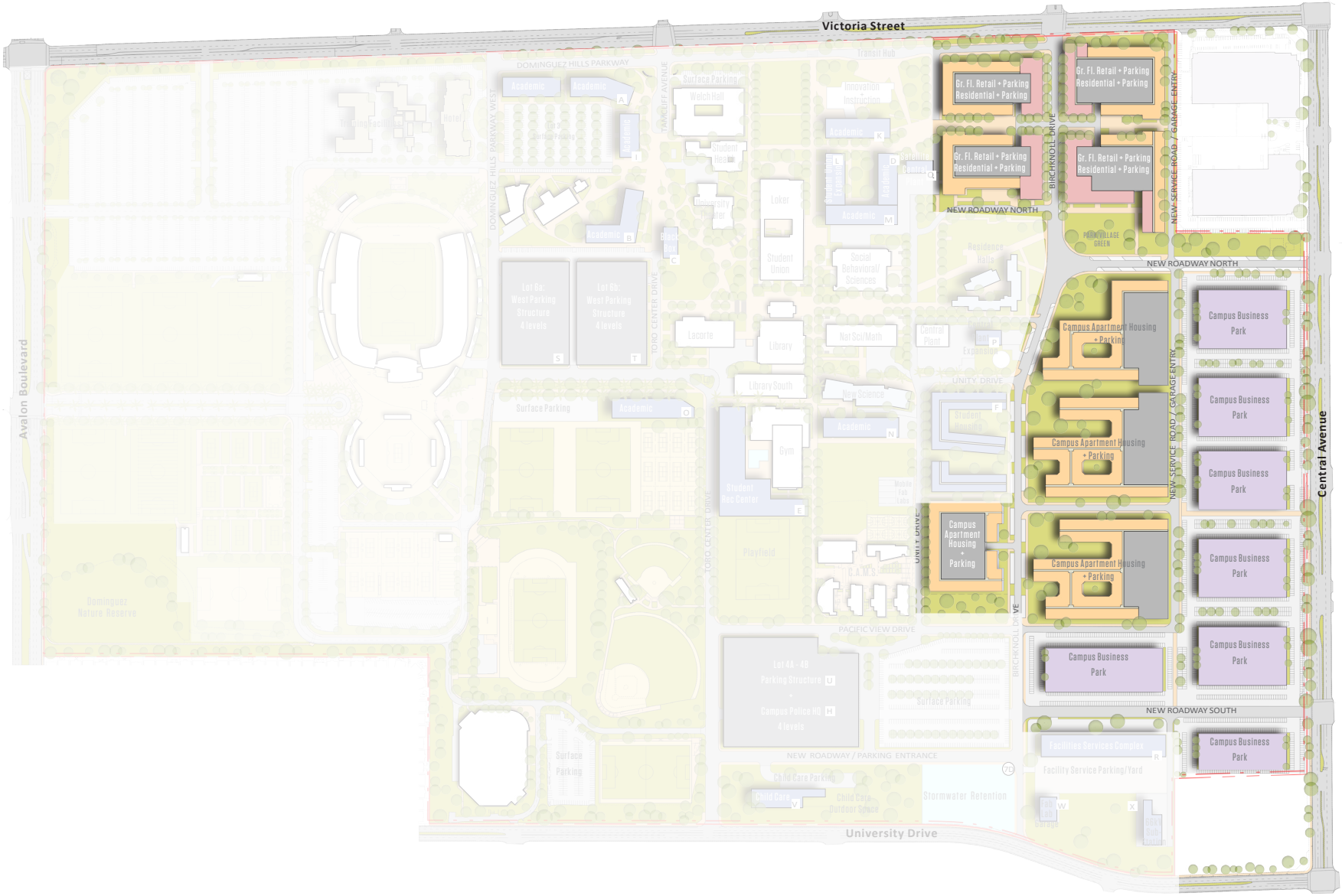


FIGURE 7. UNIVERSITY VILLAGE BUILDINGS

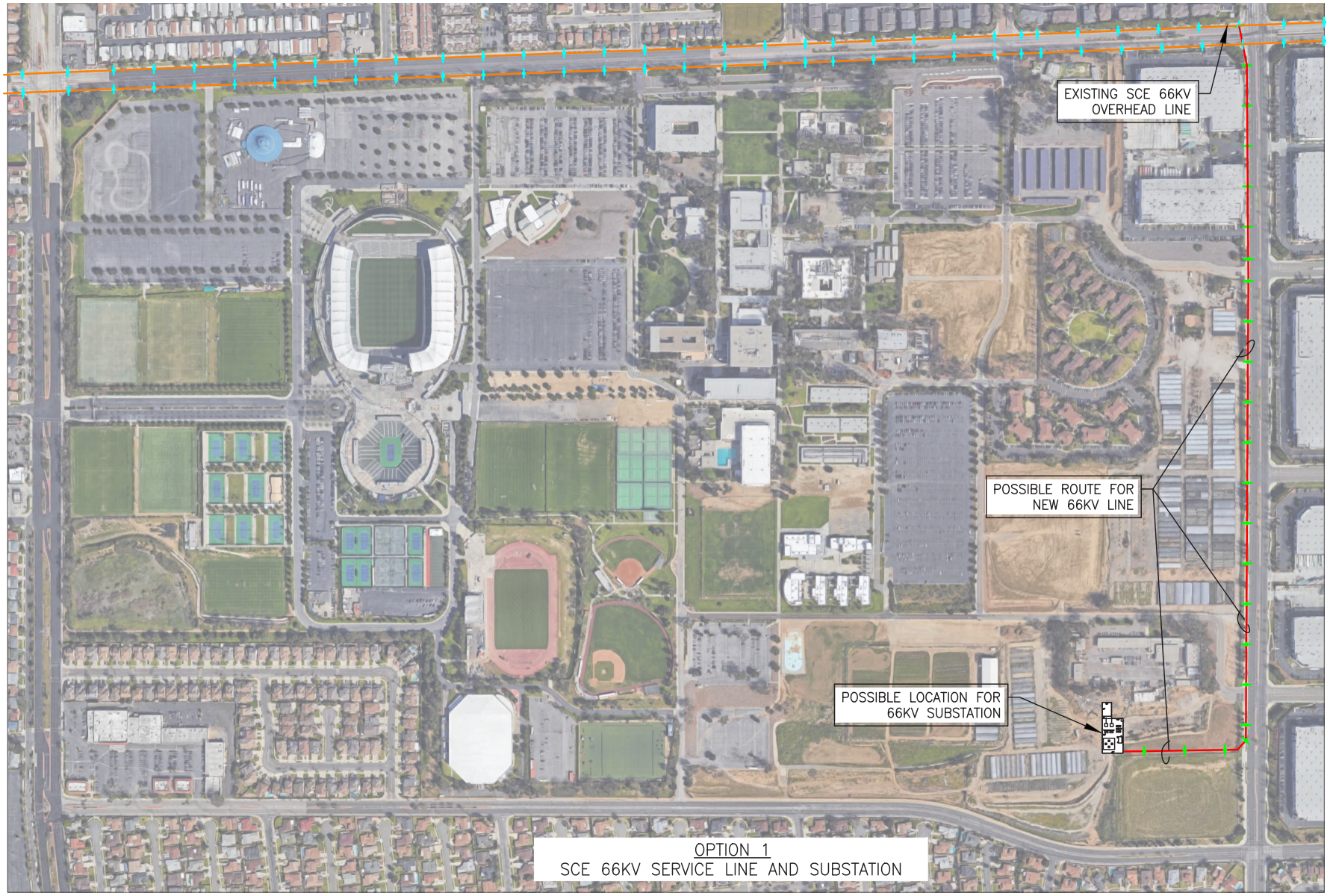


FIGURE 8. SCE 66KV LINE EXTENSION & PROPOSED 66KV SUBSTATION LOCATION: OPTION 1

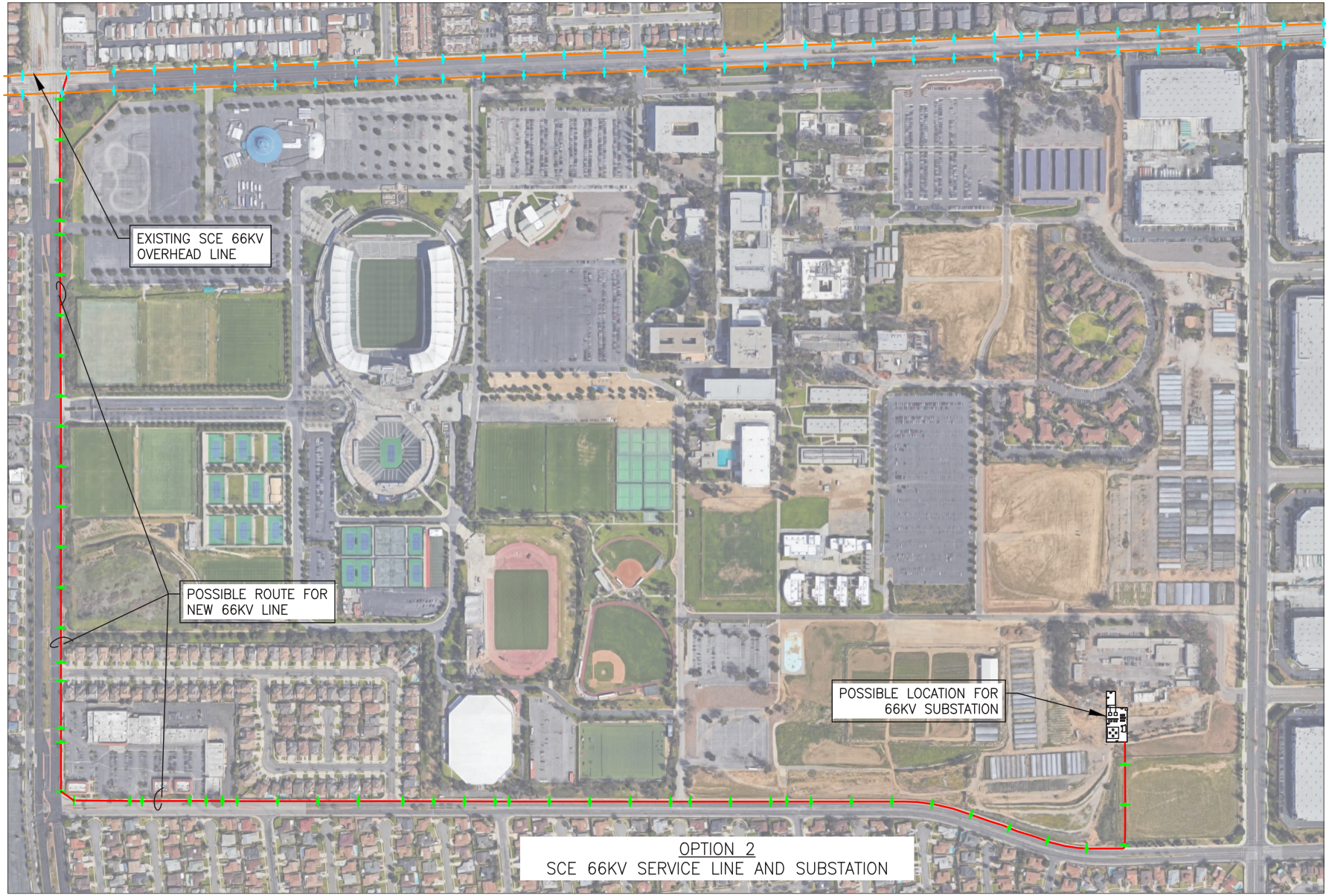


FIGURE 9. SCE 66KV LINE EXTENSION & PROPOSED 66KV SUBSTATION LOCATION: OPTION 2

IT INFRASTRUCTURE HIGHLIGHTS

PART-A: CORE CAMPUS

Core Area: 1.7 million GSF

Strategy: Work with service providers to enhance data and internet bandwidth and data transmission speeds. Upgrade the Core servers and switches. Install two separate cables to each building via different paths for redundancy. Provide increased backup power capacity to the Data Center and Campus network servers and switches. Enhance reliability and bandwidth for additional services by installing additional GigaMAN services to separate new MPOE locations.

CORE CAMPUS BUILDINGS LIST

A	Academic
B	Academic
C	Black Box Theatre
D	Academic
E	Rec Center
F	Student Apartments
I	Academic
J	Academic
K	Academic
L	Student Union Expansion
M	Academic
N	Academic
O	Academic
P	Central Plant Expansion

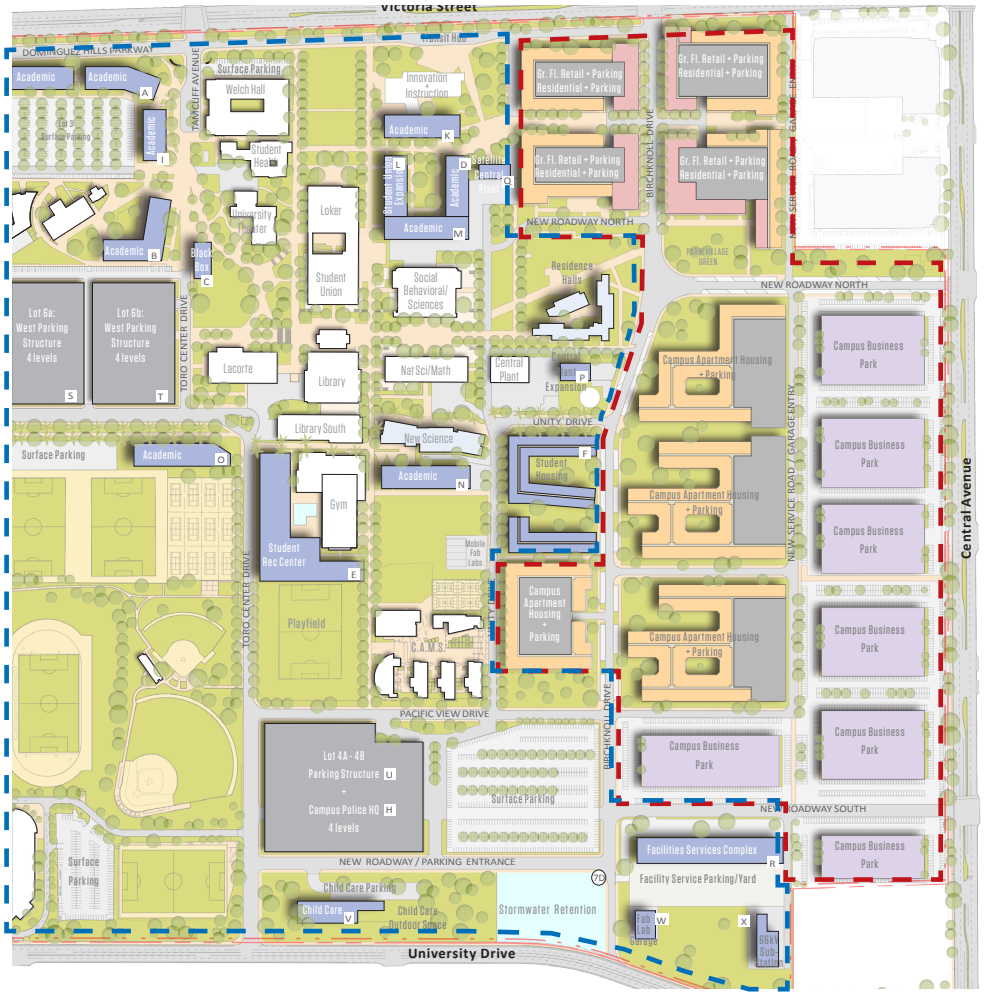


FIGURE 1. HIGHLIGHTS OF CAMPUS MASTER PLAN IT INFRASTRUCTURE

LEGEND
- CORE CAMPUS
- UNIVERSITY VILLAGE AREA

PLAN NORTH

Q	Satellite Central Plant
R	Facilities Services Complex
V	Child Care
W	Fab Lab Garage
*	Residence Halls

PART-B: UNIVERSITY VILLAGE [UV}

UV Parking Area: 1.9 million GSF
UV Building Area: 3.8 million GSF

Strategy: The University Village will consist of residential, commercial, retail, parking, and campus business park occupancies. Most of the occupancies will be third party operated, and separately metered. The University Village will be connected to the Core Campus via fiber optic cable or through Virtual Private Network (VPN) access. Data and internet service should also be provided by third party entities. A joint infrastructure will be utilized to deliver IT services to all occupants. The campus can provide cloud services for academic, incubator and residents. Separate Wifi networks will be needed.

PART A: CORE CAMPUS IT INFRASTRUCTURE

A. EXISTING SYSTEMS

The campus has three Primary Rate Interface (PRI) lines that provide a total of 72 trunks for external local telephone calls and two T1 lines that provide a total of 48 lines for external long distance telephone calls. The PRIs and T1 lines are provided from a variety of service providers including MCI, ATT and others. The PRI lines are routed via overhead fiber optic utility lines that enter at the north of campus and are routed underground down to the Main Point of Entry (MPOE) located in the ERC Library Building. The PRI lines terminate at the Intecom E PBX now supported by Mitel/Aastra. The Aastra PBX was installed in 1996. The campus has been converting the telephone service to a cloud based Voiceover IP (VoIP) system since 2014.

Figure 2 shows the campus IT infrastructure of the existing data/telecom systems infrastructure and the relative position of key points of service at campus buildings. The cabling installed in the utility tunnel is not shown.

The campus has redundant network service utilities that have divergent paths onto campus from different source connections. The network service is provided by CENIC over AT&T GigaMan fiber optic cable. The service provides connectivity with 1 GB of bandwidth. The primary network service enters campus from Victoria Street north of the SCC-1 building and is routed underground to the MPOE located in the ERC Library Building. The backup network service enters campus east of the Child Development Center and is routed underground before terminating at its MPOE located in the Welch Hall Building. The backup service remains inactive and only becomes active when the primary service fails. During a primary service failure, external internet traffic is automatically re-routed to the backup service.

The campus has two MPOE locations. One MPOE is located on the first floor of the ERC Library Building. This MPOE houses the telephone equipment, including the PBX, and the primary network service equipment. The equipment located in the ERC Library Building MPOE is provided with a variety of rack mounted Uninterruptible Power Supplies (UPS) or battery backups that are supplied power from a backup generator during a utility power failure.

The second MPOE is located on the third floor of the Welch Hall Building within the Campus Main Data Center and houses the backup network service equipment. The networking equipment and Data Center servers are connected to a variety of rack mounted UPS units which are backed up by a backup generator. The Data Center houses the campus computer network servers.

The network services installed in the ERC Library and Welsh Hall MPOEs are connected together via fiber optic cabling. The fiber optic cabling is installed in underground pathways and the utility tunnel between the two buildings.

Telephone service for all campus buildings are networked back to the primary MPOE located in the Library Building over copper lines that were originally installed to provide all telecommunication services to the buildings. Since 2014, buildings telecommunication services have been migrated to fiber optic cables to provide VoIP service to the buildings. The building Main Distribution Frame (MDF) and Intermediate Distribution Frame (IDF) rooms have been equipped with VoIP POE switches to connect VoIP handsets to a cloud based VoIP utilizing broadband internet access. The copper and fiber optic cables are routed mostly in underground ductbanks that connect between the Library Building MPOE and rest of the campus buildings.

Internet and internal networks are routed through the fiber optic network cables to the ERC Library Building MPOE. Network routers and switches are used to route the network traffic to the internal servers or to the internet as required.

The campus has multiple utility cables that provide the telephone service. Redundancy is provided over the multiple utility cables for telephone service. Though, the utility cables provide redundancy, a failure in the cable would result in a reduction of the system capacity. The PBX System is not provided with redundancy for the telephone system. The campus has two different utility cables that provide internet service. Both the primary and secondary utility serves are provided by CENIC over fiber optic cable. Both services are rated for a 1GBps connection. The primary and secondary service cables have divergent paths. The campus has two service routers that provide redundancy for routing the internet traffic. Each service router is associated with one of the two service connections. In the event of a service or router failure, the backup router and service will handle the networking duties.

The campus has a primary Data Center located on the 3rd Floor of Welch Hall. A backup Data Center, located in the ERC Library, provides some redundancy to the campus network services. The backup Data Center is limited to only critical services. As a result, only partial redundancy is provided. The campus has two core switches that provide network redundancy between the Data Center and each campus building due to a switch/router failure. However, each campus building is served

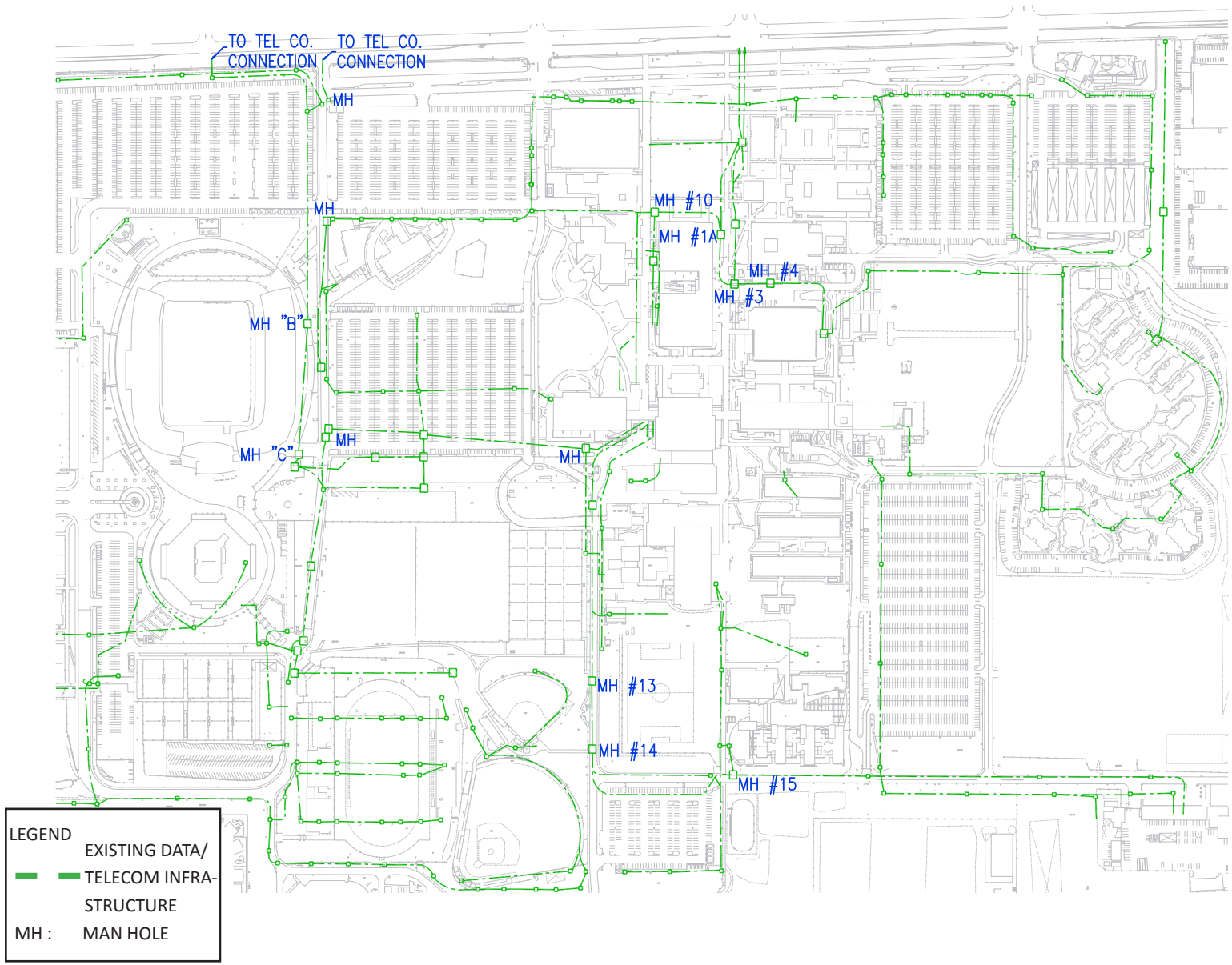


FIGURE 2. EXISTING CAMPUS DATA/TELECOM SYSTEM INFRASTRUCTURE

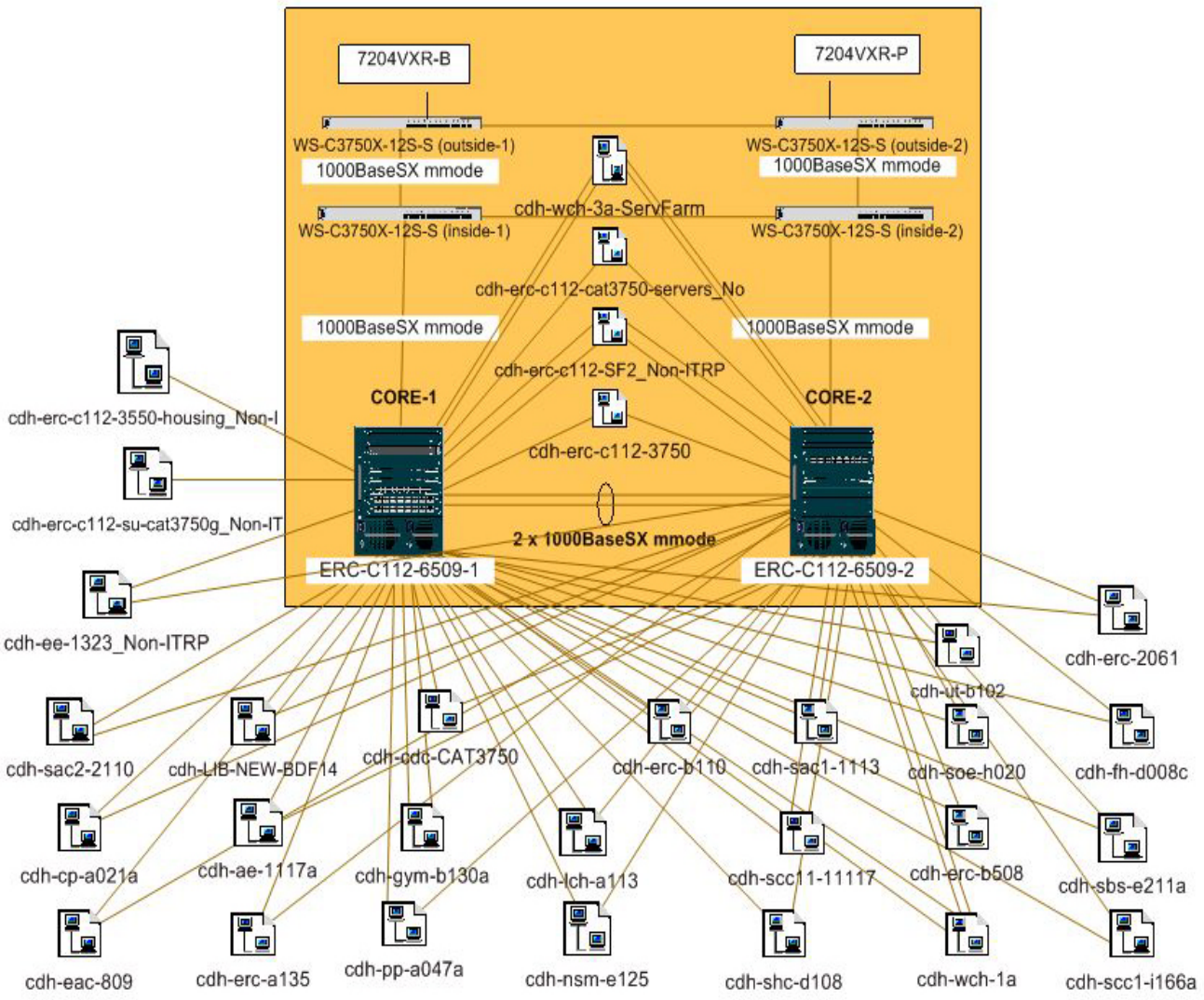


FIGURE 3. EXISTING CAMPUS IP NETWORK TOPOLOGY

through a single cable, providing no redundancy due to a cable failure and no alternate path to provide service in the event of a cable failure, damage to the cable, or demolition of the existing path. Figure 3 shows the existing campus IP network topology.

B. SYSTEM CHANGES UNDERWAY (APRIL 2017)

The Core Campus IT and Telephone services and building-to-building cable infrastructure is satisfactory for campus operations. The fiber optic cable installed to individual buildings lacks a redundant pathway, and both of the fiber connections are included in the same cable. Damage to the cable will result in a loss of communications with the building.

The system changes planned in the near term include:

1) Data Center power system upgrades to replace UPS units and power system capacity.
2) Connection of the new Science Building and Student Housing project.
3) VoIP system upgrades for individual buildings.
4) Installation of wireless access points for greater WIFI coverage in buildings and on campus.

C. SYSTEM USAGE GROWTH ASSOCIATED WITH MASTER PLAN

The IT infrastructure facilitates the deployment of IT services according to campus-wide needs. The existing campus IT infrastructure utilizes the utility tunnel that extends to twelve of the original campus buildings. The infrastructure extends to outlying buildings and areas via ductbanks, pullboxes, and manholes. Many of the building connections are single radial installed cables.

All new buildings will require fiber optic cable installed from two separate pathways to the MDF of the building. Each connection should be continuous from the campus core switches. The new fiber optic cables will provide VoIP telephone service, IT service, and internet service to each building. Copper cables were traditionally installed for telephone service. The use of copper cables should be reviewed and minimized for campus-wide communications.

Refer to Figure 4 which shows the existing IT infrastructure that will be impacted by new construction.

D. MEETING LONG TERM TELECOMMUNICATIONS NEEDS OF THE CORE CAMPUS

The planned new construction will require many of the existing ductbanks, pullboxes, and cables to be removed in order to clear construction sites for buildings, parking structures, and roadways. A new IT system infrastructure is required. The new system will be designed with reference to the California State University Telecommunications Infrastructure Planning (TIP) Standards, Fourth Edition. Industry Standards, such as Building Industry Consulting Service International (BICSI), Customer Owned Outside Plant (CO-OSP) Design Manual, should also be used to establish campus requirements for campus network design. The infrastructure should be standardized with the minimum size of manholes and pullboxes established and the minimum quantity of conduits specified. It is typical for manholes to be a minimum of 4’ x 6’ x 6’ and for pullboxes to be 4’ x 4’ x 4’ in dimension. Ductbanks should consist of 12-4”C for main ductbank and 4-4”C for the building service laterals.

Building ID	Building Name	GSF
A	Academic	158,572
B	Admin	131,800
C	Black Box Theatre	7,640
D	Academic	68,000
E	Rec Center	148,400
I	Incubator	57,128
J	Academic	136,050
K	Academic/Admin	105,850
L	Student Union Expansion	85,000
M	Academic/Admin	94,360
N	Academic/Admin	116,250
O	Academic/Admin	104,020
2	Student Housing 1	56,240
2	Student Housing 2	27,180
2	Student Housing 3	102,828
2	Student Housing 4	63,656
2	Student Housing 5	64,952
	New Science Building	85,000
TOTAL		1,612,926

TABLE 1. CORE CAMPUS - POTENTIAL BUILDINGS

The manholes and ductbank entries to the Core Network locations and MPOE should be increased in size. Manhole sizes and Core Network and Data Center locations should be a minimum of 8’ x 10’ x 6’ and the banks should increase to a minimum of 12-4”C at the Core Network locations. The Core Network locations should also have two points of entry.

The internet service is presently provided by CENIC over AT&T GigaMAN fiber optic cable with a bandwidth of 1GB. The campus will need to evaluate options to increase the bandwidth and data transmission speed in the future, such as 10GB Ethernet.

The campus should evaluate the existing MPOE and Data Center for long term needs to confirm the space available, power available, and cooling available is satisfactory. The building emergency power system capacity to maintain both the network equipment and Data Center room cooling system in operation during an extended utility power outage is essential.Refer to Figure 5 which shows possible routing for new ductbanks to replace the existing campus IT infrastructure It is recommended that the Data Centers be migrated to the stand alone “Data Center In A Box” concept support by a local standby generator. The stand alone Data Center requires roughly

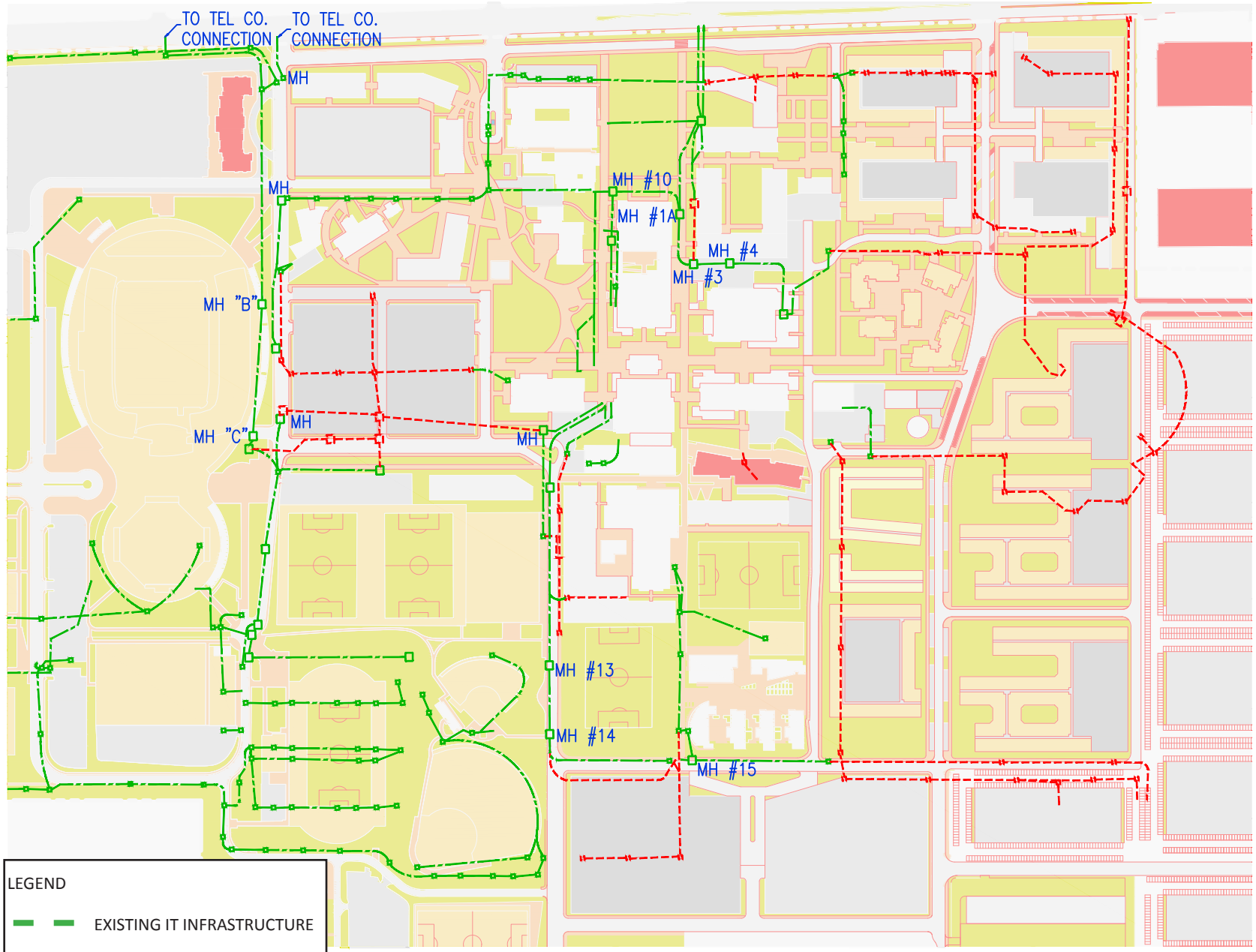


FIGURE 4. EXISTING IT INFRASTRUCTURE IMPACTED BY NEW CONSTRUCTION

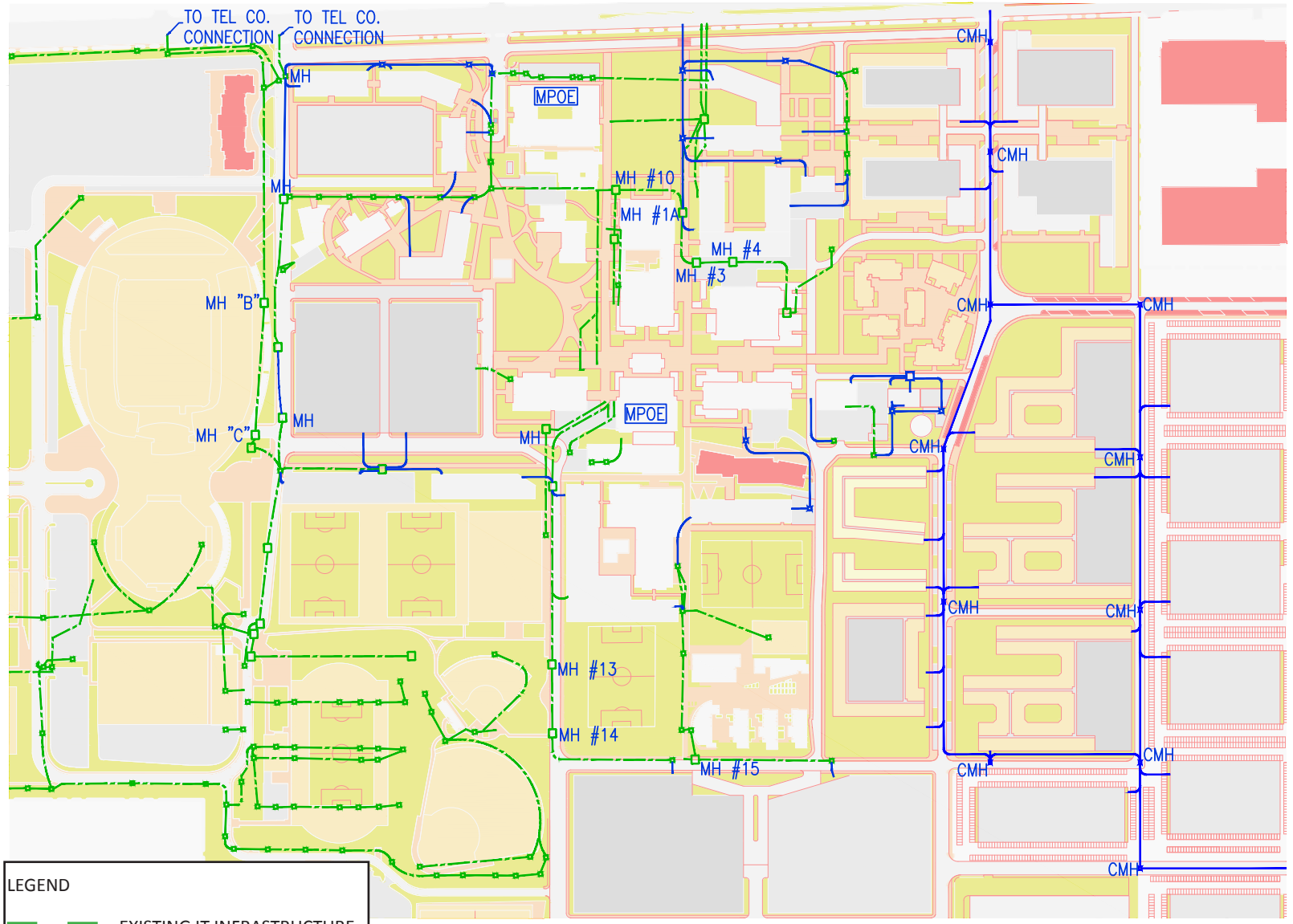


FIGURE 5. POTENTIAL BUILDING ROUTING FOR NEW DUCTBANKS TO REPLACE EXISTING CAMPUS IT INFRASTRUCTURE

PART B: UNIVERSITY VILLAGE - IT INFRASTRUCTURE

A. COMMUNICATIONS, INTERNET, AND DATA ASSOCIATED WITH MASTER PLAN

The University Village is subdivided into building parcels that will be developed over a 15-year time period. The planned development of the University Village is very dense consisting of 1.7 million GSF of parking structures, 2.5 million GSF of multi-family residential units, 94,000 GSF of retail, 690,000 GSF of apartments, and 591,000GSF of campus business park buildings.

The University Village will be provided with communications, telephone, data, internet, and cable television services by third party providers who will require a pathway to install their cable and equipment to buildings, and occupancies. The University Village will also be connected to the campus network and services. The buildings will require MDF and IDF rooms to house third party and campus equipment. The equipment will include fiber optic cable terminator cabinets, routers, and switches. Each MDF and IDF will require ample power for equipment and cooling loads. The building developer will need to determine the IT services to be provided and work with each service provider to include facilities required for service.

B. DATA AND COMMUNICATIONS OPTIONS FOR THE UNIVERSITY VILLAGE

Figure 6 includes a site plan with proposed ductbank and manhole infrastructure for data, network, and communications cable systems. The backbone duct bank structure may require up to 12-4" conduits. The ductbank and manhole infrastructure constitute the backbone for the entire University Village. Each service provider will install their own fiber optic cable in the backbone structure to each building or occupancy. Each provider should have their own dedicated 4" conduit into each building. The buildings will be designed to include an MDF to provide adequate space for all third party equipment. Each provider will establish their own requirements. The University Village IT infrastructure design should be based on industry standards such as the BICSI Customer Owned Outside Plant, Telecommunications Industry Association (TIA) publications, and ANSI/TIA/EIA-758, Customer Owned Outside Plant Telecommunications Cabling Standard.

Connection to the campus network can be accomplished in several ways. The campus can install cable and equipment to provide cloud services, CENIC fiber optic service for academic occupancies, WIFI service in select areas of the University Village such as campus apartment housing and retail. Connection to the campus network can also be accomplished via LAN, WAN, and VPN.

The campus IT department will evaluate the extent to which they will support campus network connections within the University Village for a variety of IT services, and then communicate their requirements for cable and equipment installation to the developer. The IT infrastructure shown in Figure 5 will support the campus cable requirements.

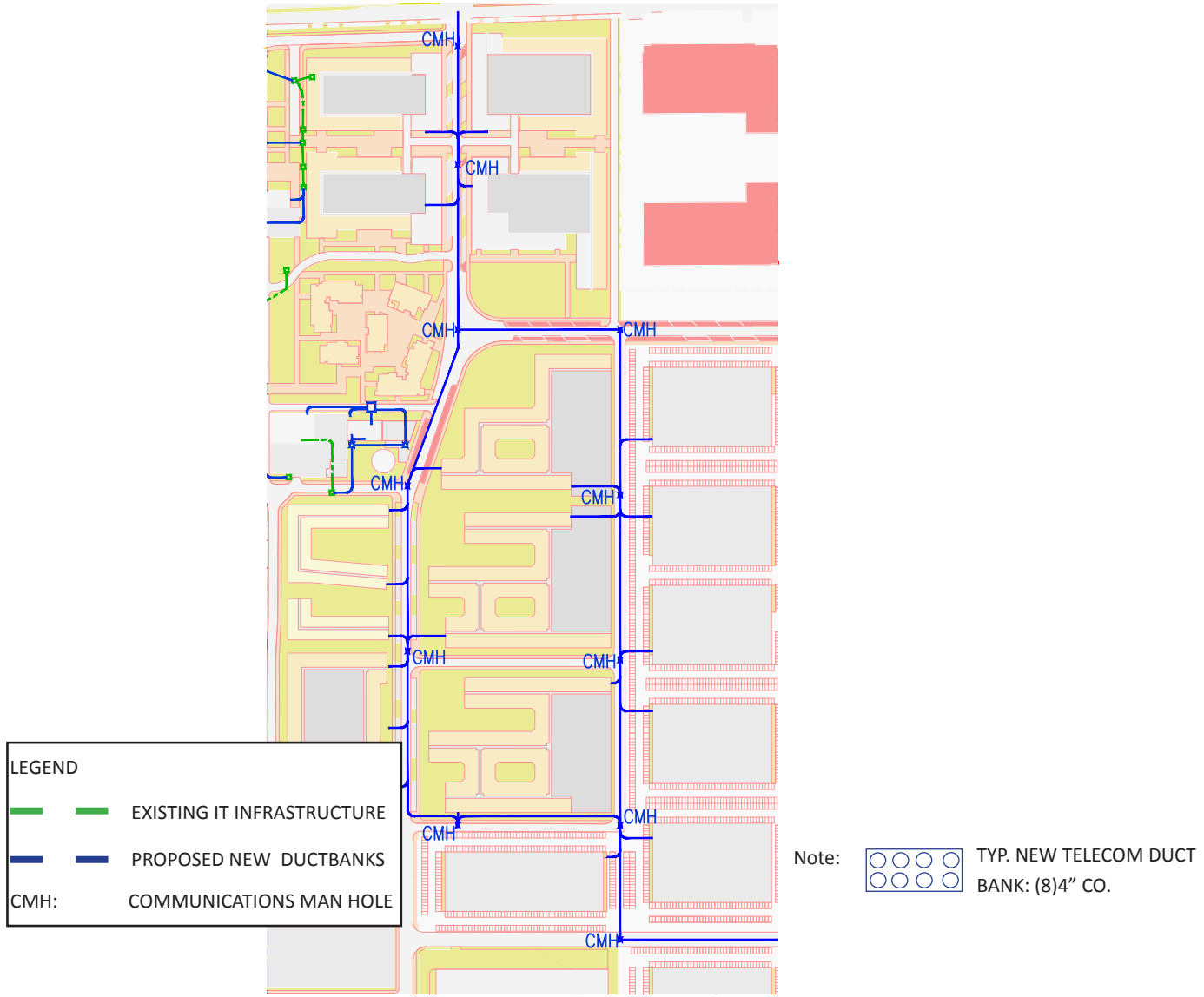


FIGURE 6. PROPOSED DUCTBANK AND MANHOLE IT INFRASTRUCTURE FOR UNIVERSITY VILLAGE

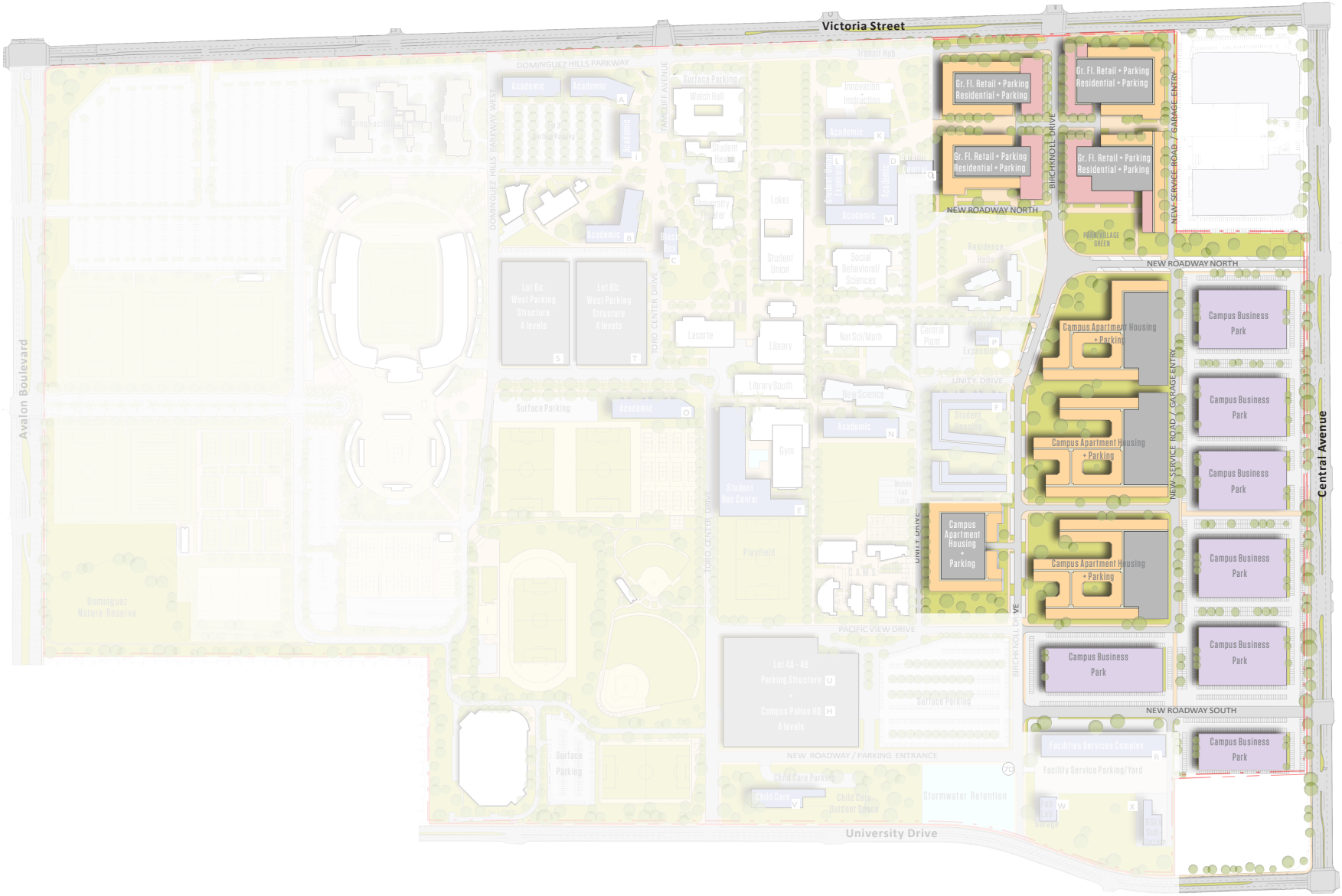


FIGURE 7. UNIVERSITY VILLAGE BUILDINGS

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B.4: Civil Engineer Report

The **University Village** is an urban design concept within the CSUDH 2018 Master Plan that integrates the academic core and the student residential community with a neighborhood of retail and business communities and campus apartment housing to create a live/work/play environment with synergistic connections to the University's mission and purpose. Unless otherwise noted, the Design Guidelines analyses and reports appearing in this Appendix address all the parcels of the University Village.

CAMPUS SANITARY SEWER SYSTEM

SANITARY SEWER INFRASTRUCTURE HIGHLIGHTS

PART-A: CORE CAMPUS

Core Area: 1.7 million GSF

Strategy: The addition of sewer flow from new buildings and facilities will increase velocities and improve operation of the system. Provide new 6-inch service or multiple 4-inch services.

CORE CAMPUS BUILDINGS LIST

A	Academic
B	Academic
C	Black Box Theatre
D	Academic
E	Rec Center
F	Student Apartments
I	Incubator
J	Academic
K	Academic
L	Student Union Expansion
M	Academic
N	Academic
O	Academic
P	Central Plant Expansion
Q	Satellite Central Plant
R	Facilities Services Complex
V	Child Care
W	Fab Lab Garage
*	Residence Halls

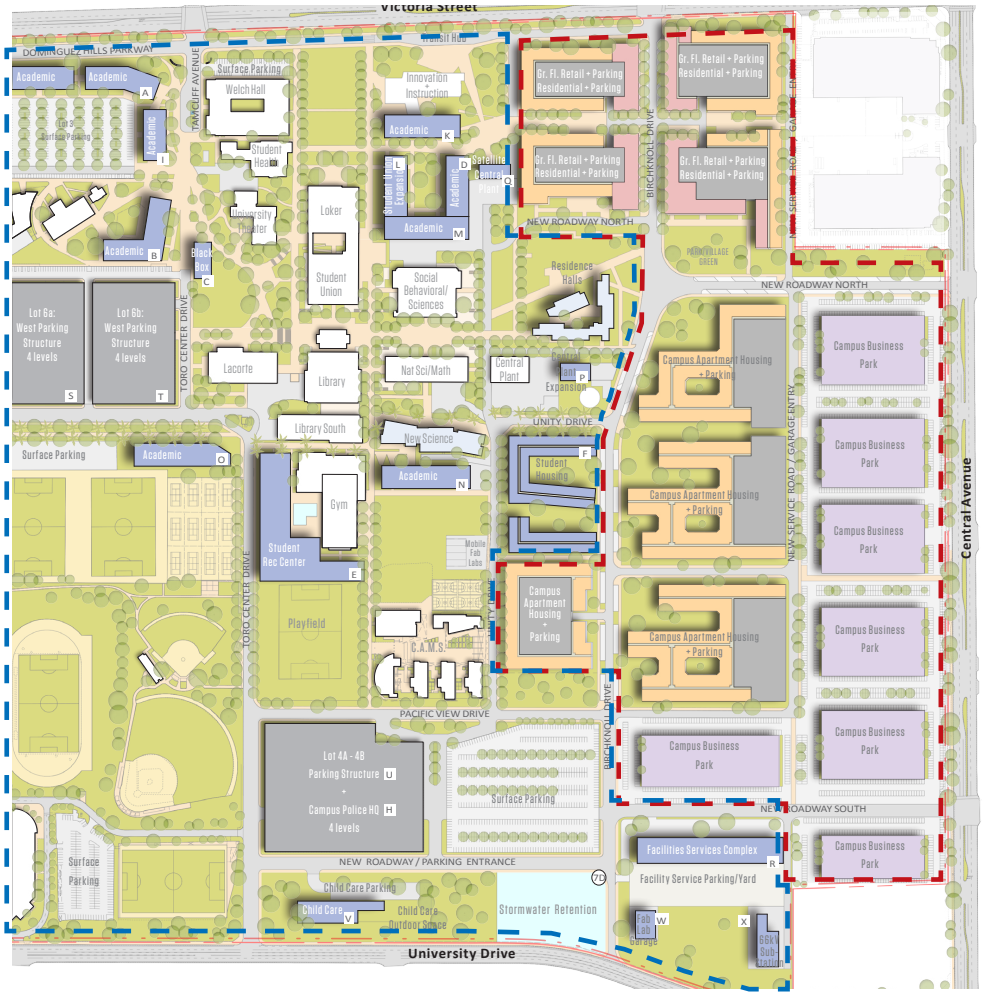


FIGURE 1. HIGHLIGHTS OF CAMPUS MASTER PLAN SEWER INFRASTRUCTURE

LEGEND

- - - - CORE CAMPUS

- - - - UNIVERSITY VILLAGE AREA

PLAN NORTH

PART-B: UNIVERSITY VILLAGE [UV]

UV Parking Area: 1.9 million GSF
UV Building Area: 3.8 million GSF

Strategy: sewer lines will connect with core campus to help reach necessary transport velocities.

UNIVERSITY VILLAGE - PROPOSED DEVELOPMENT

- Campus Apartment Housing
- Campus Business Park
- Retail

PART A: CORE CAMPUS SANITARY SEWER INFRASTRUCTURE

A. EXISTING SYSTEMS

The existing sewer provides service to the entire CSUDH campus (Central Campus, Child Development Center, Continuing Ed and Facilities) the on-site California Academy of Mathematics and Science School (CAMS) and the Stub Hub sports complex (formerly the Home Deport Center).

Sanitary sewer service is provided to the campus by the City of Carson at four connections; an 8-inch line at the north side of campus on Victoria Street; second a 12-inch pipe on the western portion of the campus on Avalon Blvd which serves the Extended Education buildings as well as the privately owned and run Stub Hub sports complex. The remaining two sewer connections are on the south side of the campus at University Drive; a 12-inch line at Fariman Drive that serves the central campus, Student Housing 2, and the University sports fields to the southwest; and an 8-inch connection to the east of Caney Ave that serves the Physical Plant.

B. SYSTEM CHANGES UNDERWAY (APRIL 2017)

In general, the existing sanitary sewer network on campus is oversized. While this provides more than sufficient capacity for existing facilities and significant expansion, the system does not create transport velocities in several reaches of the system at peak rates. Additional sewer flow from new buildings and faculties will increase velocities and improve operation of the system. For this reason, no improvements to the downstream reaches are necessary.

Table 1 represents the existing demand flow for both sanitary sewer and domestic water lines. Unit flows can be found from the Board of Directors of County Sanitation District No.8 ordinance. The average water flow must be calculated in order to obtain a sewer peak flow. Loading for Each Class of Land Use – LACSD: http://www.lacsd.org/civicax/filebank/blobdload.aspx?blobid=3531

Table 2 represents the proposed demand flow for both sanitary sewer and domestic waterlines for new campus buildings. Unit flows can be found from the Board of Directors of County Sanitation District No. 8 ordinance. Loading for Each Class of Land Use – LACSD: http://www.lacsd.org/civicax/filebank/blobdload.aspx?blobid=3531

		EXISTING DEMAND FLOW				
BUILDING NAME	PLANNED USE	BASIC GSF	UNIT FLOW (GPD/1000 SF)	AVERAGE WATER/SEWER FLOW (GPD)	AVERAGE WATER FLOW (GPM)	PEAK SEWER FLOW (GPM)
(SCC-1) SMALL COLLEGE COMPLEX 1	CLASSROOM/OFFICE	8,529	200	1,706	1.18	7.11
(SCC-2) SMALL COLLEGE COMPLEX 2	CLASSROOM/OFFICE	5,313	200	1,063	0.74	4.43
(SCC-3) SMALL COLLEGE COMPLEX 3	CLASSROOM/OFFICE	1,263	200	253	0.18	1.05
(SCC-4) SMALL COLLEGE COMPLEX 4	CLASSROOM/OFFICE	1,263	200	253	0.18	1.05
(SCC-5) SMALL COLLEGE COMPLEX 5	CLASSROOM/OFFICE	5,315	200	1,063	0.74	4.43
(SCC-6) SMALL COLLEGE COMPLEX 6	CLASSROOM/OFFICE	5,841	200	1,168	0.81	4.87
(SCC-7) SMALL COLLEGE COMPLEX 7	CLASSROOM/OFFICE	2,145	200	429	0.30	1.79
(SCC-8) SMALL COLLEGE COMPLEX 8	CLASSROOM/OFFICE	2,920	200	584	0.41	2.43
(SCC-9) SMALL COLLEGE COMPLEX 9	CLASSROOM/OFFICE	1,626	200	325	0.23	1.36
(SCC-10) SMALL COLLEGE COMPLEX 10	CLASSROOM/OFFICE	2,145	200	429	0.30	1.79
(SCC-11) SMALL COLLEGE COMPLEX 11	CLASSROOM/OFFICE	5,841	200	1,168	0.81	4.87
(SCC-13) SMALL COLLEGE COMPLEX 13	CLASSROOM/OFFICE	5,290	200	1,058	0.73	4.41
(COE) SCHOOL OF EDUCATION	CLASSROOM/OFFICE	26,433	200	5,287	3.67	22.03
(LIB) LEO F. CAIN LIBRARY	LIBRARY	152,006	100	15,201	10.56	63.34
LIBRARY ADDITION	LIBRARY	139,569	100	13,957	9.69	58.15
(WH) JAMES L. WELCH HALL	CLASSROOM/OFFICE	179,952	200	35,990	24.99	149.96
(SHC) STUDENT HEALTH CENTER	PROFESSIONAL BLDG	20,046	300	6,014	4.18	25.06
(LSU) LOKER STUDENT UNION	COLLEGE/UNIV UNION	123,033	300	36,910	25.63	153.79
(SBS) SOCIAL/BEHAVIORAL SCIENCES	CLASSROOM/OFFICE	81,000	200	16,200	11.25	67.50
(LCH) LA CORTE HALL	CLASSROOM/OFFICE	70,331	200	14,066	9.77	58.61
(UT) UNIVERSITY THEATRE	INDOOR THEATRE	25,201	125	3,150	2.19	13.13
(NSM) NATURAL SCIENCES/MATHEMATICS	CLASSROOM/OFFICE	85,500	200	17,100	11.88	71.25
(GYM) GYMNASIUM	GYM. W/ SHOWER	65,752	600	39,451	27.40	164.38
(FH) FIELD HOUSE	CLASSROOM/OFFICE	13,650	200	2,730	1.90	11.38
(SP) SWIMMING POOL	SWIMMING POOL	-	-	2,600	1.81	10.83
(BLDG A) PUEBLO DOMINGUEZ SH-1	RESIDENCE HALL	89,220	300	26,766	18.59	111.53
(BLDG X) PUEBLO DOMINGUEZ SH-2	RESIDENCE HALL	76,093	300	22,828	15.85	95.12
(PP) PHYSICAL PLANT	PLANT/OFFICES	27,826	200	5,565	3.86	23.19
(CP) CENTRAL PLANT	PLANT	12,840	150	1,926	1.34	8.03
(SAC-1) SOUTH ACADEMIC COMPLEX 1	CLASSROOM/OFFICE	15,500	200	3,100	2.15	12.92
(SAC-2) SOUTH ACADEMIC COMPLEX 2	CLASSROOM/OFFICE	15,940	200	3,188	2.21	13.28
(SAC-3) SOUTH ACADEMIC COMPLEX 3	CLASSROOM/OFFICE	17,280	200	3,456	2.40	14.40
(HC) HUGHES ATHLETIC AND EDUCATION	CLASSROOM/OFFICE	2,843	200	569	0.39	2.37
(EE) EXTENDED EDUCATION CENTER	CLASSROOM/OFFICE	24,619	200	4,924	3.42	20.52
(CAMS) CA. ACADEMY OF MATH AND SCIENCE	CLASSROOM/OFFICE	31,667	200	6,333	4.40	26.39
BASEBALL/SOFTBALL STORAGE	WAREHOUSING	3,380	25	85	0.06	0.35
(EAC) EAST ACADEMIC COMPLEX	CLASSROOM/OFFICE	17,760	200	3,552	2.47	14.80
(CAMS) CA. ACADEMY OF MATH AND SCIENCE	CLASSROOM/OFFICE	13,548	200	2,710	1.88	11.29
(CDC) CHILD DEVELOPMENT CENTER	CLASSROOM/OFFICE	4,320	200	864	0.60	3.60
(ITC) INFANT TODDLER CENTER	CLASSROOM/OFFICE	4,320	200	864	0.60	3.60
	TOTAL	**1,387,120**		**304,883**		

TABLE 1. EXISTING DEMAND FLOW

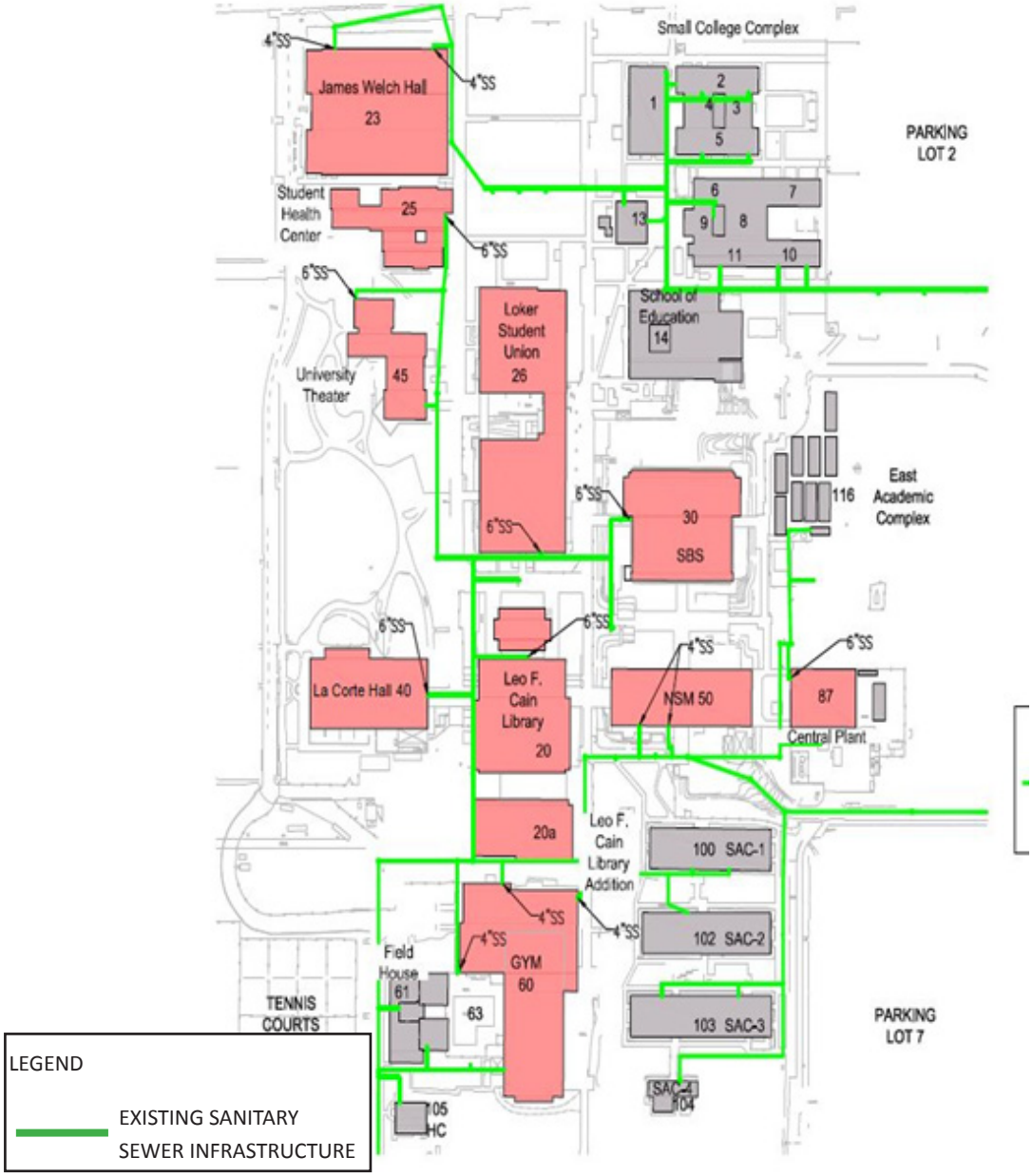


FIGURE 2. EXISTING SANITARY SEWER INFRASTRUCTURE

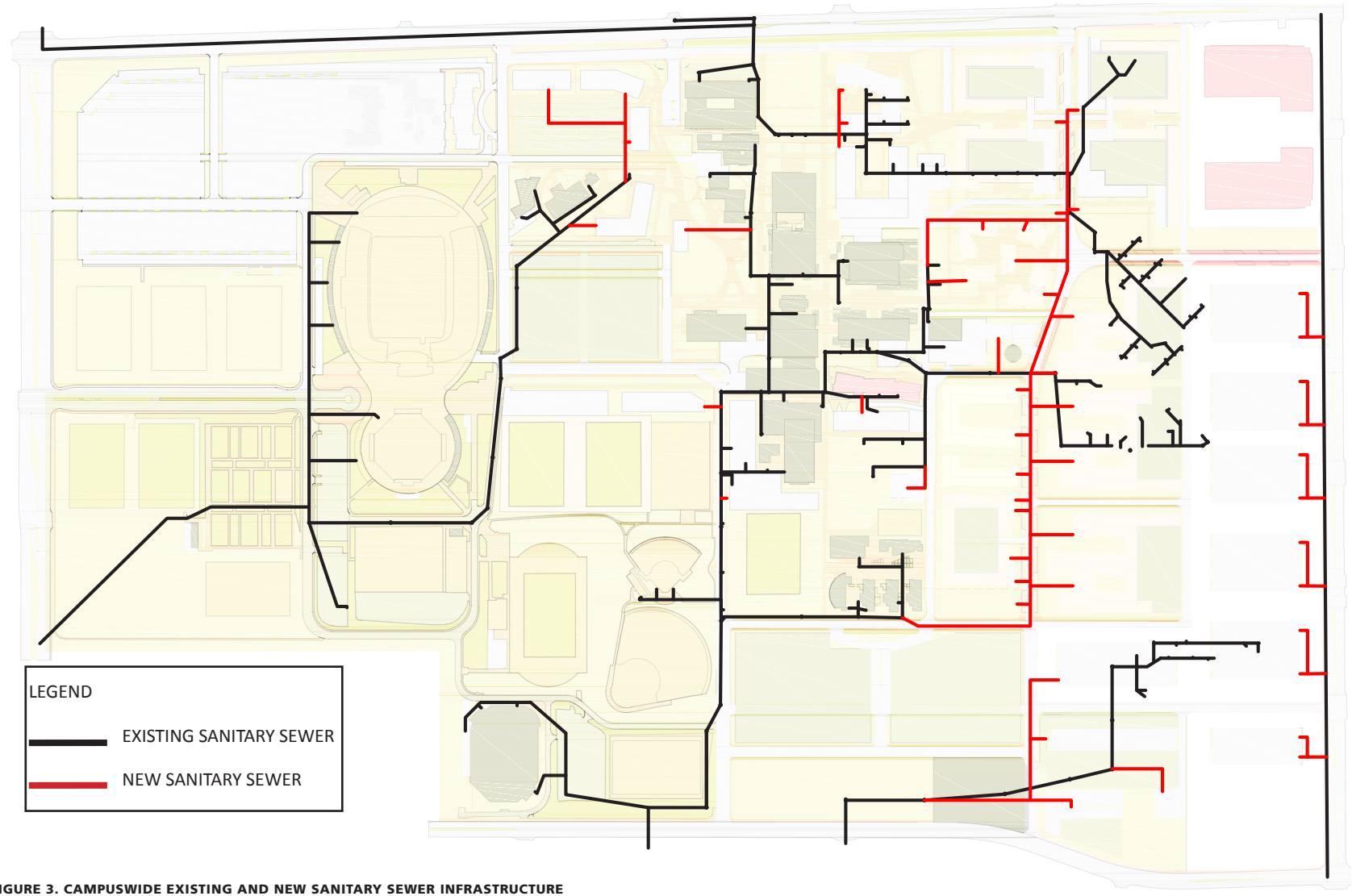
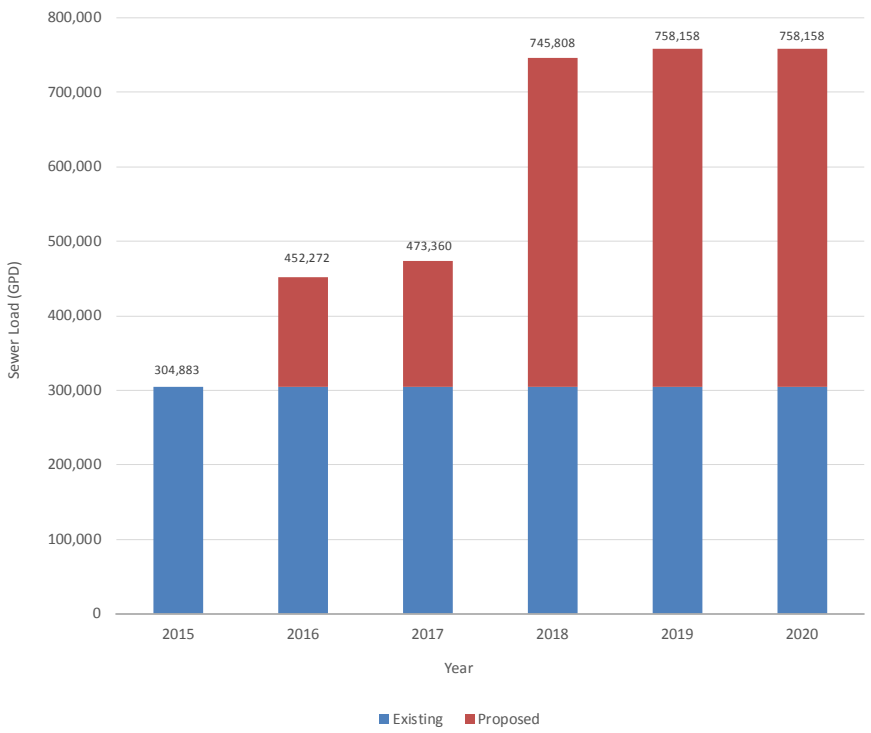


FIGURE 3. CAMPUSWIDE EXISTING AND NEW SANITARY SEWER INFRASTRUCTURE



GRAPH 1. EXISTING AND PROPOSED SEWER LOAD

		PROPOSED DEMAND FLOW				
BUILDING NAME	Building ID	PLANNED USE	BASIC GSF	UNIT FLOW (GPD/1000 SF)	AVERAGE WATER/SEWER FLOW (GPD)	PEAK SEWER FLOW (GPM)
Student Housing Ph.1 (600 Beds)	2A	Housing	189000	300	56700	236.25
Student Recreation Center	E	Recreation	151148	600	90688.8	377.87
Admin	B	Administration	105440	200	21088	87.87
LaCorte Hall Expansion		Classroom/Office	51600	200	10320	43.00
Academic	A	Unassigned	221400	200	44280	184.50
Black Box Theatre	C	Arts	7640	125	955	3.98
Non-State	I	Incubator/Foundation	87300	200	17460	72.75
Academic	J	Acad/Admin	170935	200	34187	142.45
Academic	K	Acad/Admin	106485	200	21297	88.74
Student Union Expansion	L	LSU	85188	200	17037.6	70.99
Acad/Admin	M	Health, Human Services	116000	300	34800	145.00
Acad/Admin	N	Acad/Admin	123770	200	24754	103.14
Acad/Admin	O	Acad/Admin	130025	300	39007.5	162.53
Student Housing Ph. 2 (300 Beds)	2B	Housing	94500	300	28350	118.13
Parking Structure		Parking Structure	-	-	-	-
Plant Operations	P	Central Plant	6000	150	900	3.75
Plant Operations	Q	Satellite Central Plant	47000	150	7050	29.38
Extended Education		Classroom/Office	22000	200	4400	18.33
TOTAL					**453,275**	**1,889**

TABLE 2. PROPOSED DEMAND FLOW IN CORE CAMPUS

PART B: UNIVERSITY VILLAGE AREA SANITARY SEWER INFRASTRUCTURE

A. EXISTING SYSTEMS

The existing sewer provides service to the entire CSUDH campus (Central Campus, Child Development Center, Continuing Ed and Facilities) the on-site California Academy of Mathematics and Science School (CAMS) and the Stub Hub sports complex (formerly the Home Deport Center).

Sanitary sewer service is provided to the campus by the City of Carson at four connections; an 8-inch line at the north side of campus on Victoria Street; second a 12-inch pipe on the western portion of the campus on Avalon Blvd. Two sewer connections are on the south side of the campus at University Drive; a 12-inch line at Fariman Drive; and an 8-inch connection to the east of Caney Ave.

B. NEW SYSTEMS

The new sanitary sewer system will have to coordinate with the utility master plan update. It is recommended that appropriate pipe size to achieve sufficient transport flow. The sanitary sewer system for the core campus is oversized and does not create the necessary transport velocities.

University Village sewer lines will connect with campus to help reach the necessary transport velocity. Size sewer pipe for actual flow from low-flow fixtures and design for minimum scour velocity.

The analysis of sanitary sewer system included the Child Care portion of Parcel 4A. It is recognized that the development of a new Child Care/Development Center located along University Drive is expected to be constructed and maintained by the campus.

Table 3. presents proposed sanitary sewer demand flow in the University Village area.

		LDP DEMAND FLOW			
PARCEL NUMBER/LAND USE	PLANNED USE	GSF/UNIT OR GSF X 1000	FLOW/UNIT	AVERAGE WATER/SEWER FLOW (GPD)	PEAK SEWER FLOW (GPM)
1-A Multi-Family	Family Rental	235	156	36,660	153
1-A Retail	Retail	16.445	150	2,467	10
1-B Multi-Family	Family Rental	250	156	39,000	163
1-B Retail	Retail	20.63	150	3,095	13
3-A Apartments	Student Apartments	244	156	38,064	159
3-B Apartments	Faculty Apartments	288	156	44,928	187
4-A Multi-Family	Family Rental	270	156	42,120	176
4-A Child Care	Child Care	13.125	200	2,625	11
4-A Retail	Retail	17.695	150	2,654	11
4-B Multi Family	Family Rental	274	156	42,744	178
4-B Retail	Retail	39.495	150	5,924	25
5-A Multi Family	Family Rental	236	156	36,816	153
5-B Multi Family	Family Rental	340	156	53,040	221
5-C Multi Family	Family Rental	330	156	51,480	215
6-A Business Park	Office Building	345.6	200	69,120	288
6-B Business Park	Office Building	140.4	200	28,080	117
7-A Business Park	Office Building	86.4	200	17,280	72
TOTAL				516,097	2,150

TABLE 3. PROPOSED DEMAND FLOW IN THE UNIVERSITY VILLAGE

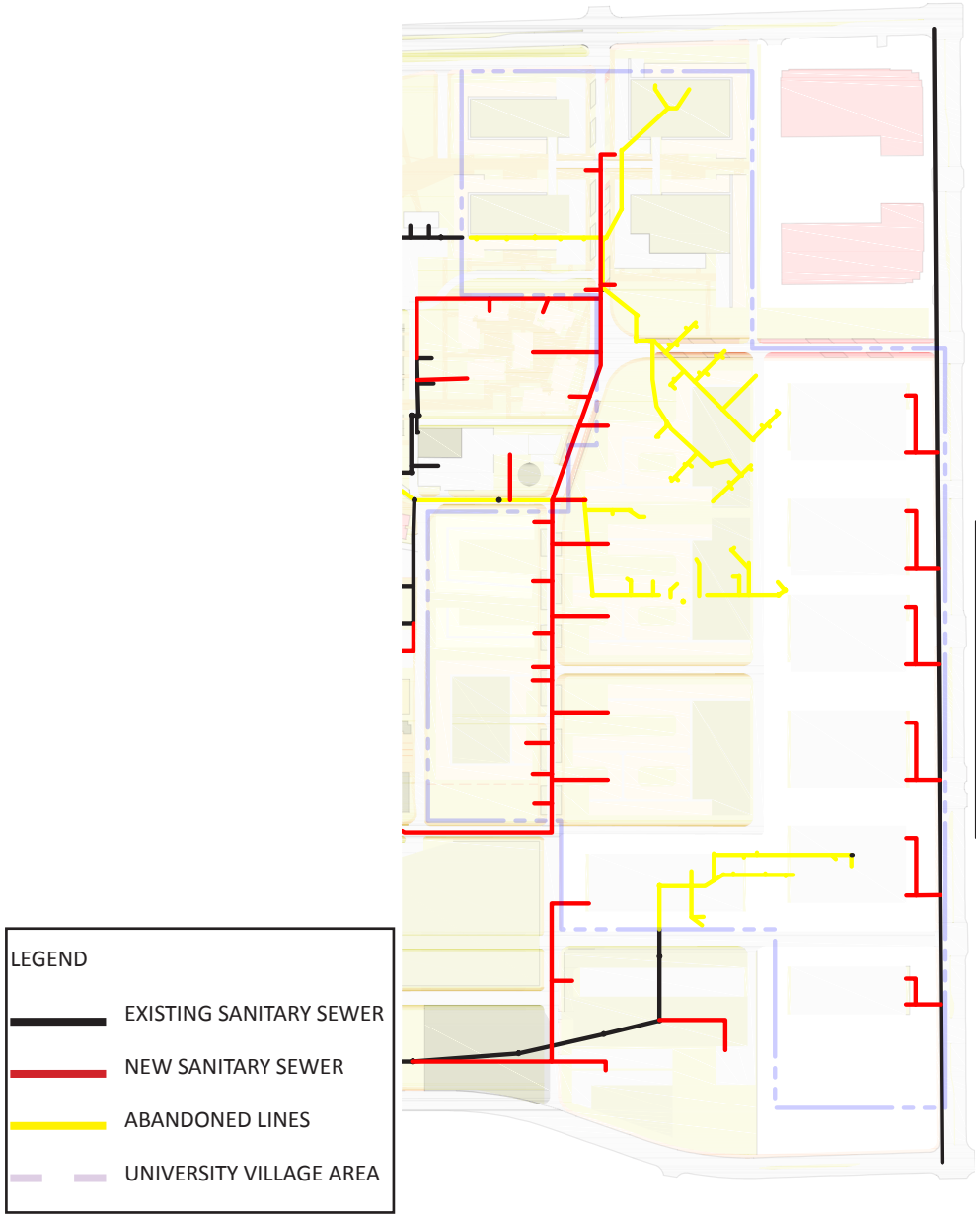


FIGURE 4. UNIVERSITY VILLAGE AREA EXISTING AND NEW SANITARY SEWER INFRASTRUCTURE

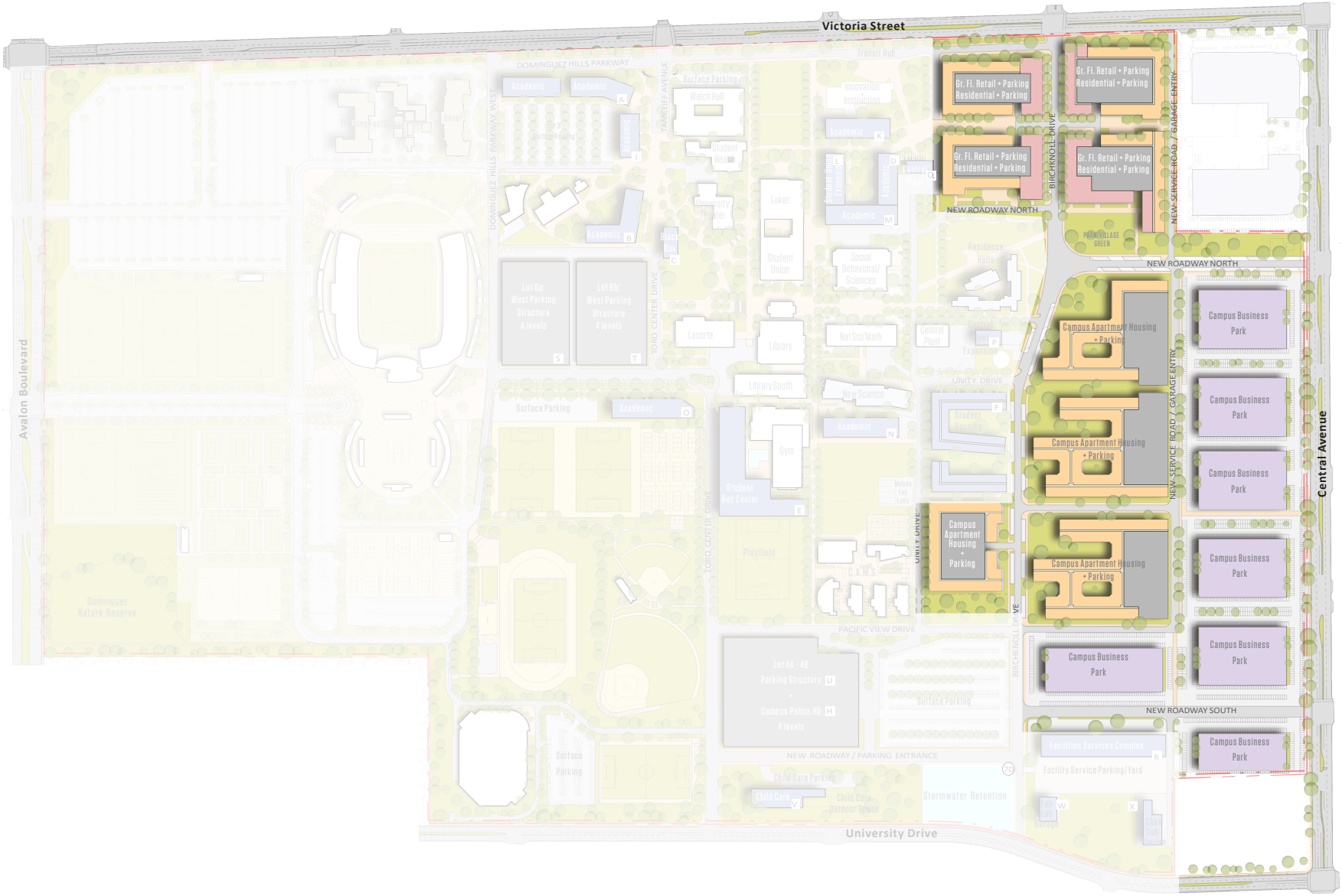


FIGURE 5. UNIVERSITY VILLAGE BUILDINGS

CAMPUS DOMESTIC WATER INFRASTRUCTURE

DOMESTIC WATER INFRASTRUCTURE HIGHLIGHTS

PART-A: CORE CAMPUS

Core Area: 1.7 million GSF

Long term: Provide new service connection from existing domestic water network.

Strategy: The domestic water system has sufficient capacity to provide potable water to existing facilities and the proposed future facilities. It is expected that with the completion of the additional facilities the water service from Victoria Boulevard will provide additional flow. Under current conditions, that service provides minimal flow.

CORE CAMPUS BUILDINGS LIST

A	Academic
B	Academic
C	Black Box Theatre
D	Academic
E	Rec Center
F	Student Apartments
I	Academic
J	Academic
K	Academic
L	Student Union Expansion
M	Academic
N	Academic
O	Academic
P	Central Plant Expansion

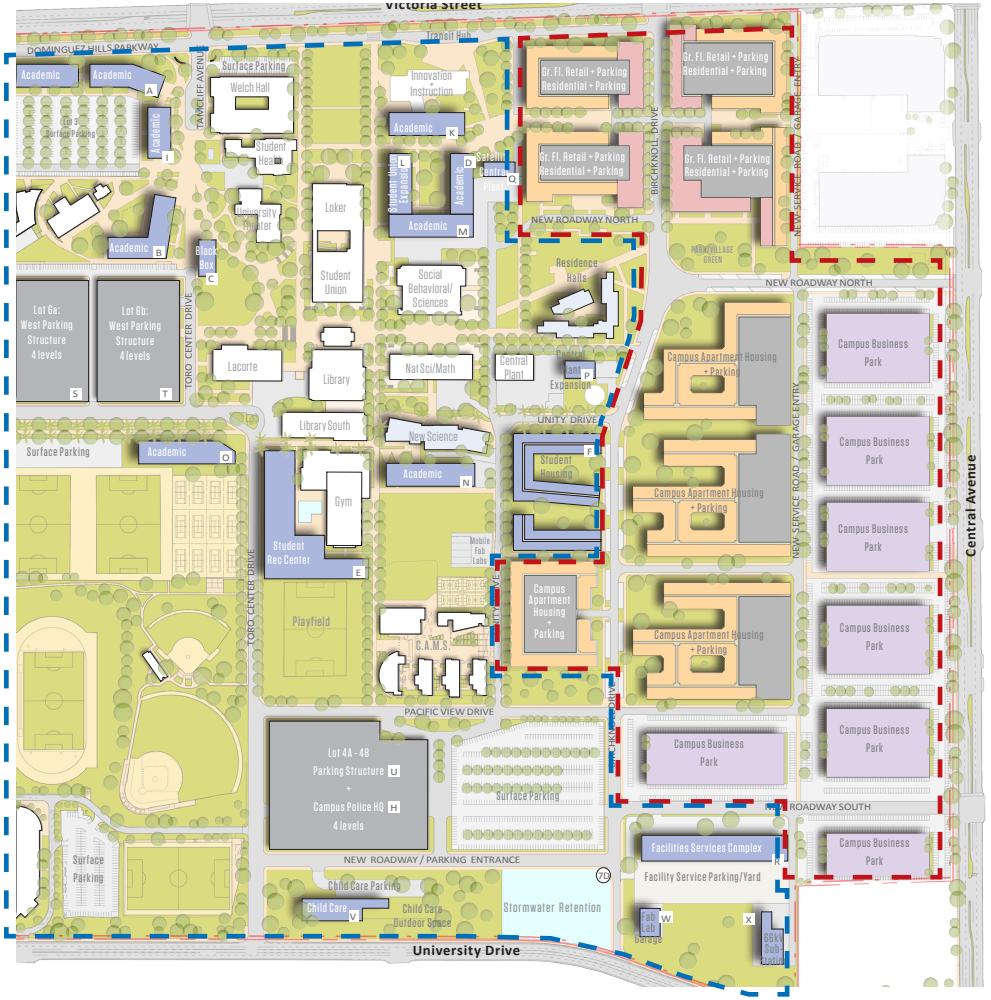


FIGURE 1. HIGHLIGHTS OF CAMPUS MASTER PLAN DOMESTIC WATER INFRASTRUCTURE

LEGEND
- – – – CORE CAMPUS
- – – – UNIVERSITY VILLAGE AREA

PLAN NORTH

Q	Satellite Central Plant
R	Facilities Services Complex
V	Child Care
W	Fab Lab Garage
*	Residence Halls

PART-B: UNIVERSITY VILLAGE [UV]

UV Parking Area: 1.9 million GSF
UV Building Area: 3.8 million GSF

Strategy: Create a looping system between the University Village and the core campus with separate meters for billing.

UNIVERSITY VILLAGE - PROPOSED DEVELOPMENT

- Campus Apartment Housing
- Campus Business Park
- Retail

PART A: CORE CAMPUS DOMESTIC WATER INFRASTRUCTURE

A. EXISTING CONDITIONS

Domestic water service is provided to the CSUDH campus by California Water Service (CWS) Company in Torrance CA. There are numerous connections off the main that run through the southern quarter of the campus (the former main for Dominguez Water Company), from east to west with a tee that turns south to University Drive. The main water service connection for the campus is a 12-inch line on the east side of campus (Detail A on CSUDH Master Utilities Plan for Domestic Water), just east of CAMS. There is a 12-inch connection west on this line for the main campus (Detail B), used as a back-up if pressure drops, which has not happened in recent years. This CWS water main also serves the Stub Hub Complex on separate connections. The third large 12" connection for back-up on campus is from the CWS main in Victoria Street. The Child Development Center (CDC) buildings in the northeast portion of campus have their own connections to the water main in Victoria, each for the CDC and the Infant Toddler Center (ITC). The campus has approximately 34 fire hydrants, not counting the Stub Hub complex. Fire water for the University is served directly off the domestic waterline system for fire hydrants and building fire sprinklers. For this reason, water modeling and analysis is conducted for fire flow requirements, which guarantees there will be sufficient pressure for domestic use. The campus does not have any water pumps for their domestic/fire water system.

B. SYSTEM CHANGES UNDERWAY (APRIL 2017)

The domestic water system has sufficient capacity to provide potable water to existing facilities and the proposed future facilities. Only laterals from water mains to new buildings will be required.

Table 1 represents the existing demand flow for both sanitary sewer and domestic water lines. Unit flows can be found from the Board of Directors of County Sanitation District No.8 ordinance. The average water flow must be calculated in order to obtain a sewer peak flow. Loading for Each Class of Land Use – LACSD: http://www.lacsd.org/civicax/filebank/blobdload.aspx?blobid=3531

		EXISTING DEMAND FLOW				
BUILDING NAME	PLANNED USE	BASIC GSF	UNIT FLOW (GPD/1000 SF)	AVERAGE WATER/SEWER FLOW (GPD)	AVERAGE WATER FLOW (GPM)	PEAK SEWER FLOW (GPM)
(SCC-1) SMALL COLLEGE COMPLEX 1	CLASSROOM/OFFICE	8,529	200	1,706	1.18	7.11
(SCC-2) SMALL COLLEGE COMPLEX 2	CLASSROOM/OFFICE	5,313	200	1,063	0.74	4.43
(SCC-3) SMALL COLLEGE COMPLEX 3	CLASSROOM/OFFICE	1,263	200	253	0.18	1.05
(SCC-4) SMALL COLLEGE COMPLEX 4	CLASSROOM/OFFICE	1,263	200	253	0.18	1.05
(SCC-5) SMALL COLLEGE COMPLEX 5	CLASSROOM/OFFICE	5,315	200	1,063	0.74	4.43
(SCC-6) SMALL COLLEGE COMPLEX 6	CLASSROOM/OFFICE	5,841	200	1,168	0.81	4.87
(SCC-7) SMALL COLLEGE COMPLEX 7	CLASSROOM/OFFICE	2,145	200	429	0.30	1.79
(SCC-8) SMALL COLLEGE COMPLEX 8	CLASSROOM/OFFICE	2,920	200	584	0.41	2.43
(SCC-9) SMALL COLLEGE COMPLEX 9	CLASSROOM/OFFICE	1,626	200	325	0.23	1.36
(SCC-10) SMALL COLLEGE COMPLEX 10	CLASSROOM/OFFICE	2,145	200	429	0.30	1.79
(SCC-11) SMALL COLLEGE COMPLEX 11	CLASSROOM/OFFICE	5,841	200	1,168	0.81	4.87
(SCC-13) SMALL COLLEGE COMPLEX 13	CLASSROOM/OFFICE	5,290	200	1,058	0.73	4.41
(COE) SCHOOL OF EDUCATION	CLASSROOM/OFFICE	26,433	200	5,287	3.67	22.03
(LIB) LEO F. CAIN LIBRARY	LIBRARY	152,006	100	15,201	10.56	63.34
LIBRARY ADDITION	LIBRARY	139,569	100	13,957	9.69	58.15
(WH) JAMES L. WELCH HALL	CLASSROOM/OFFICE	179,952	200	35,990	24.99	149.96
(SHC) STUDENT HEALTH CENTER	PROFESSIONAL BLDG	20,046	300	6,014	4.18	25.06
(LSU) LOKER STUDENT UNION	COLLEGE/UNIV UNION	123,033	300	36,910	25.63	153.79
(SBS) SOCIAL/BEHAVIORAL SCIENCES	CLASSROOM/OFFICE	81,000	200	16,200	11.25	67.50
(LCH) LA CORTE HALL	CLASSROOM/OFFICE	70,331	200	14,066	9.77	58.61
(UT) UNIVERSITY THEATRE	INDOOR THEATRE	25,201	125	3,150	2.19	13.13
(NSM) NATURAL SCIENCES/MATHEMATICS	CLASSROOM/OFFICE	85,500	200	17,100	11.88	71.25
(GYM) GYMNASIUM	GYM. W/ SHOWER	65,752	600	39,451	27.40	164.38
(FH) FIELD HOUSE	CLASSROOM/OFFICE	13,650	200	2,730	1.90	11.38
(SP) SWIMMING POOL	SWIMMING POOL	-	-	2,600	1.81	10.83
(BLDG A) PUEBLO DOMINGUEZ SH-1	RESIDENCE HALL	89,220	300	26,766	18.59	111.53
(BLDG X) PUEBLO DOMINGUEZ SH-2	RESIDENCE HALL	76,093	300	22,828	15.85	95.12
(PP) PHYSICAL PLANT	PLANT/OFFICES	27,826	200	5,565	3.86	23.19
(CP) CENTRAL PLANT	PLANT	12,840	150	1,926	1.34	8.03
(SAC-1) SOUTH ACADEMIC COMPLEX 1	CLASSROOM/OFFICE	15,500	200	3,100	2.15	12.92
(SAC-2) SOUTH ACADEMIC COMPLEX 2	CLASSROOM/OFFICE	15,940	200	3,188	2.21	13.28
(SAC-3) SOUTH ACADEMIC COMPLEX 3	CLASSROOM/OFFICE	17,280	200	3,456	2.40	14.40
(HC) HUGHES ATHLETIC AND EDUCATION	CLASSROOM/OFFICE	2,843	200	569	0.39	2.37
(EE) EXTENDED EDUCATION CENTER	CLASSROOM/OFFICE	24,619	200	4,924	3.42	20.52
(CAMS) CA. ACADEMY OF MATH AND SCIENCE	CLASSROOM/OFFICE	31,667	200	6,333	4.40	26.39
BASEBALL/SOFTBALL STORAGE	WAREHOUSING	3,380	25	85	0.06	0.35
(EAC) EAST ACADEMIC COMPLEX	CLASSROOM/OFFICE	17,760	200	3,552	2.47	14.80
(CAMS) CA. ACADEMY OF MATH AND SCIENCE	CLASSROOM/OFFICE	13,548	200	2,710	1.88	11.29
(CDC) CHILD DEVELOPMENT CENTER	CLASSROOM/OFFICE	4,320	200	864	0.60	3.60
(ITC) INFANT TODDLER CENTER	CLASSROOM/OFFICE	4,320	200	864	0.60	3.60
	TOTAL	**1,387,120**		**304,883**		

TABLE 1. EXISTING DEMAND FLOW

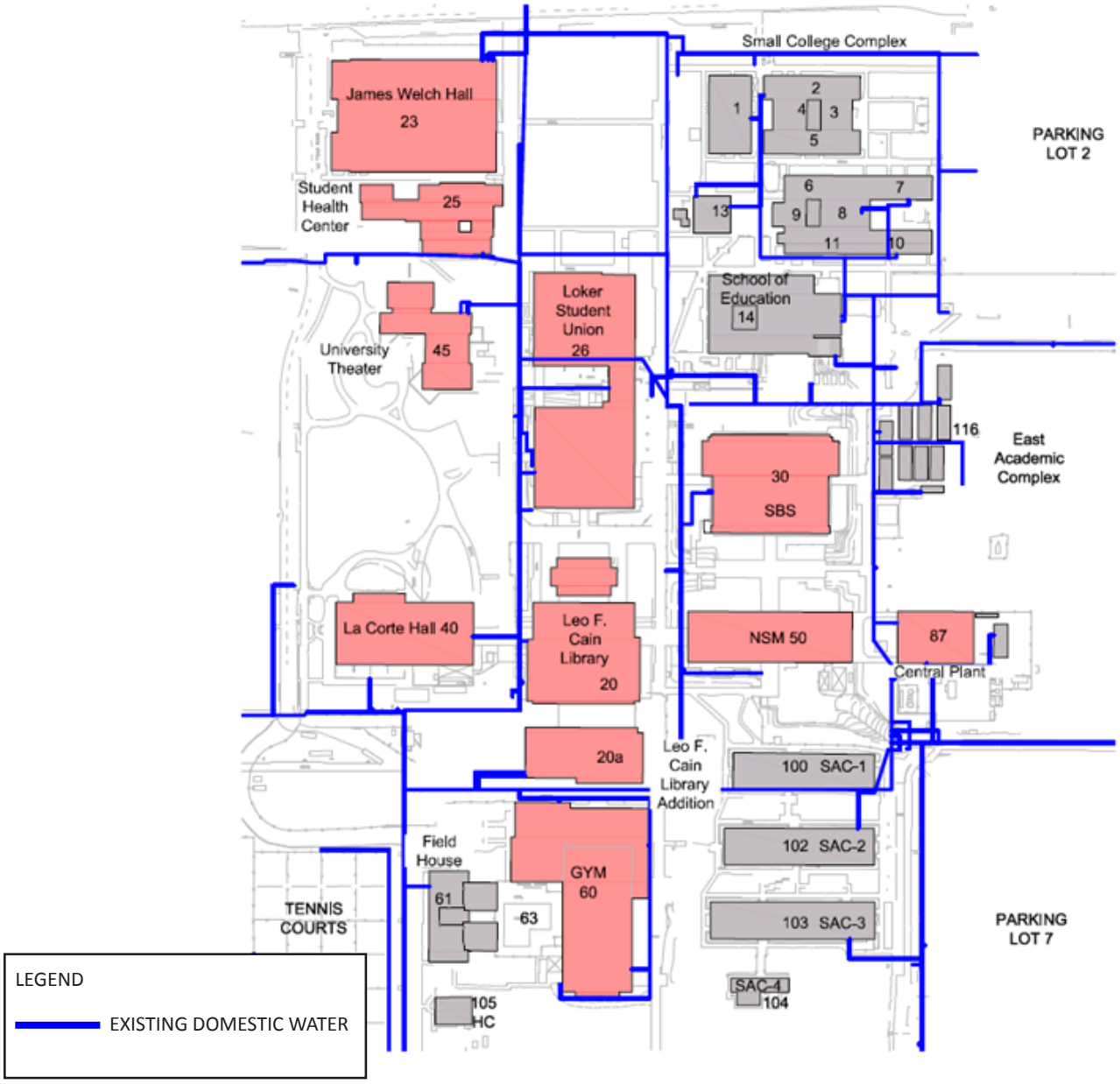
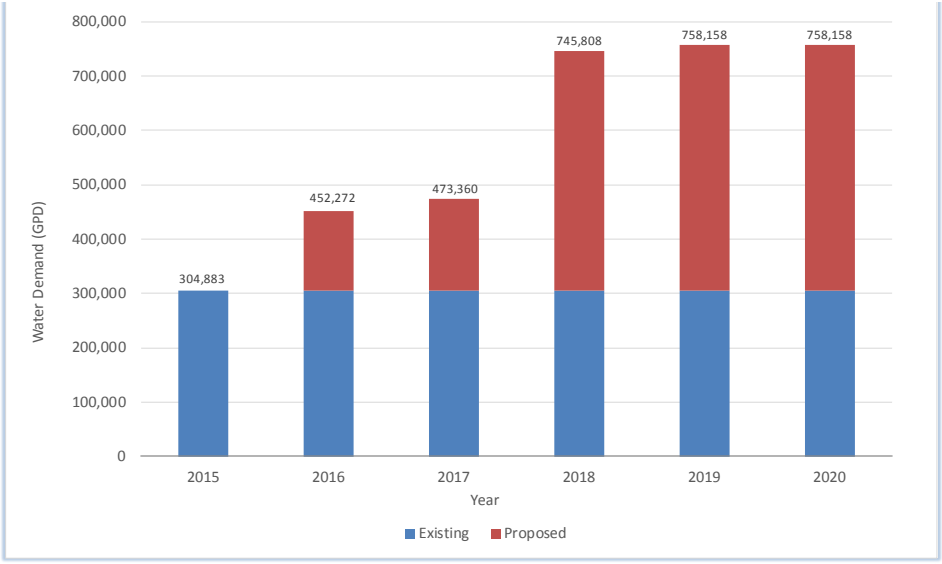


FIGURE 2. EXISTING DOMESTIC WATER INFRASTRUCTURE

Table 2 represents the proposed demand flow for both sanitary sewer and domestic water-lines for new campus buildings. Unit flows can be found from the Board of Directors of County Sanitation District No. 8 ordinance. Loading for Each Class of Land Use – LACSD: http://www.lacsd.org/civicax/filebank/blobdload.aspx?blobid=3531

		PROPOSED DEMAND FLOW				
BUILDING NAME	Building ID	PLANNED USE	BASIC GSF	UNIT FLOW (GPD/1000 SF)	AVERAGE WATER/SEWER FLOW (GPD)	PEAK SEWER FLOW (GPM)
Student Housing Ph.1 (600 Beds)	2A	Housing	189000	300	56700	236.25
Student Recreation Center	E	Recreation	151148	600	90688.8	377.87
Admin	B	Administration	105440	200	21088	87.87
LaCorte Hall Expansion		Classroom/Office	51600	200	10320	43.00
Academic	A	Unassigned	221400	200	44280	184.50
Black Box Theatre	C	Arts	7640	125	955	3.98
Non-State	I	Incubator/Foundation	87300	200	17460	72.75
Academic	J	Acad/Admin	170935	200	34187	142.45
Academic	K	Acad/Admin	106485	200	21297	88.74
Student Union Expansion	L	LSU	85188	200	17037.6	70.99
Acad/Admin	M	Health, Human Services	116000	300	34800	145.00
Acad/Admin	N	Acad/Admin	123770	200	24754	103.14
Acad/Admin	O	Acad/Admin	130025	300	39007.5	162.53
Student Housing Ph. 2 (300 Beds)	2B	Housing	94500	300	28350	118.13
Parking Structure		Parking Structure	-	-	-	-
Plant Operations	P	Central Plant	6000	150	900	3.75
Plant Operations	Q	Satellite Central Plant	47000	150	7050	29.38
Extended Education		Classroom/Office	22000	200	4400	18.33
TOTAL					453,275	1,889

TABLE 2. PROPOSED DEMAND FLOW IN CORE CAMPUS



GRAPH 1. EXISTING AND PROPOSED DOMESTIC WATER DEMAND

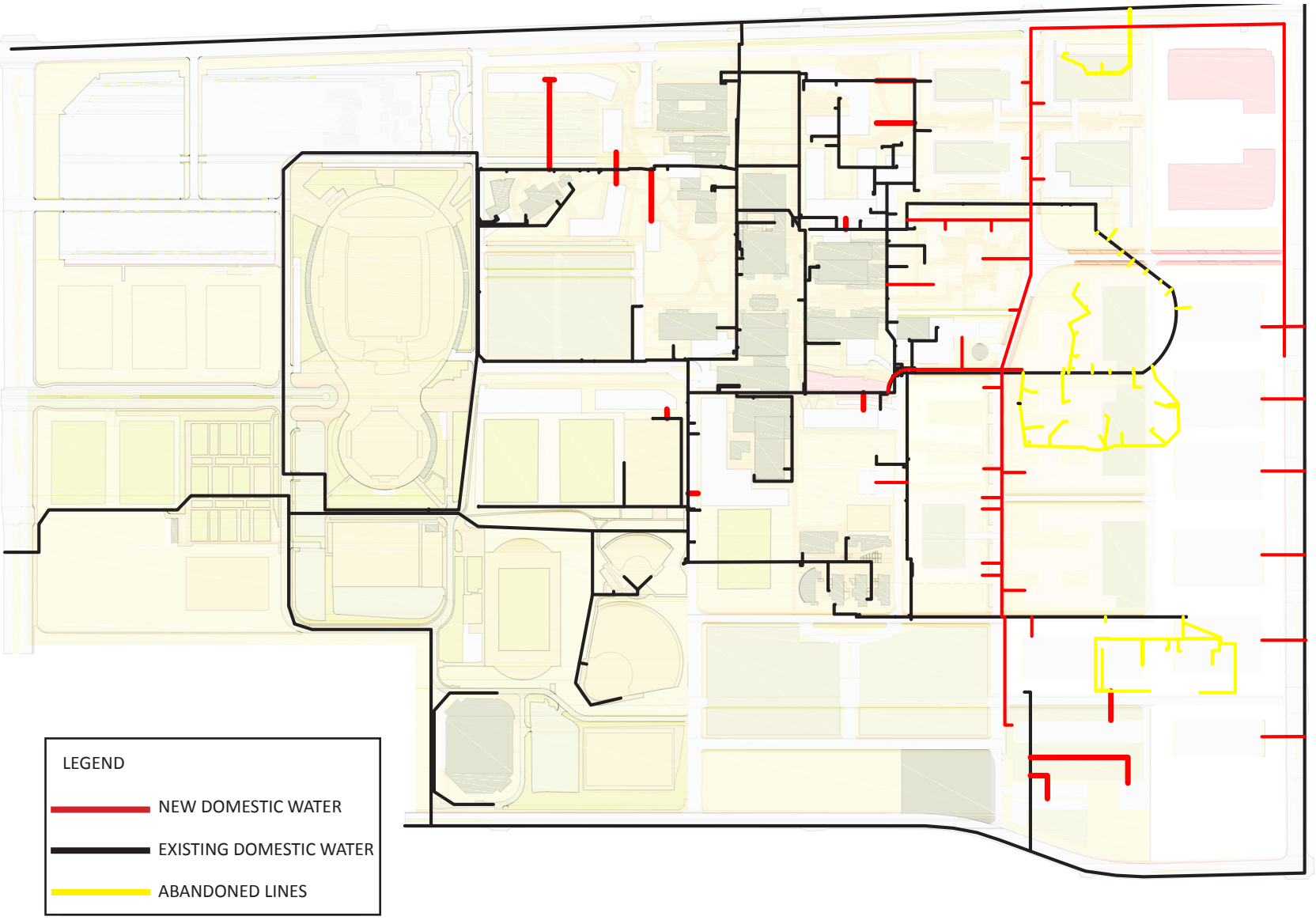


FIGURE 3. EXISTING AND NEW DOMESTIC WATER INFRASTRUCTURE

PART B: UNIVERSITY VILLAGE AREA DOMESTIC WATER INFRASTRUCTURE

A. EXISTING CONDITIONS

Domestic water service is provided to the CSUDH campus by California Water Service (CWS) Company in Torrance CA. The main water service connection for the campus is a 12-inch on the east side of. There is a 12-inch connection west on this line for the main campus (Detail B), used as a back-up if pressure drops, which has not happened in recent years. This CWS water main also serves the Stub Hub Complex on separate connections. The third large 12" connection for back-up on campus is from the CWS main in Victoria Street. The Child Development Center (CDC) buildings in the northeast portion of campus have their own connections to the water main in Victoria, each for the CDC and the Infant Toddler Center (ITC). The campus has approximately 34 fire hydrants, not counting the Stub Hub complex. Fire water for the University is served directly off the domestic waterline system for fire hydrants and building fire sprinklers.

B. NEW CONDITIONS

The Core campus and the University Village will have a loop domestic water system. New connections for the University Village will be located on Victoria street and Central avenue. The Core campus and the University Village will each have separate meters for separate billing. Only laterals from water mains to new buildings will be required.

The analysis of domestic water system included the Child Care portion of Parcel 4A. It is recognized that the development of a new Child Care/Development Center located along University Drive is expected to be constructed and maintained by the campus.

Table 3. presents the proposed demand flow for domestic water in the University Village area.

		LDP DEMAND FLOW			
PARCEL NUMBER/LAND USE	PLANNED USE	GSF/UNIT OR GSF X 1000	FLOW/UNIT	AVERAGE WATER/SEWER FLOW (GPD)	PEAK SEWER FLOW (GPM)
1-A Multi-Family	Family Rental	235	156	36,660	153
1-A Retail	Retail	16.445	150	2,467	10
1-B Multi-Family	Family Rental	250	156	39,000	163
1-B Retail	Retail	20.63	150	3,095	13
3-A Apartments	Student Apartments	244	156	38,064	159
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4-B Retail	Retail	39.495	150	5,924	25
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6-A Business Park	Office Building	345.6	200	69,120	288
6-B Business Park	Office Building	140.4	200	28,080	117
7-A Business Park	Office Building	86.4	200	17,280	72
TOTAL				516,097	2,150

TABLE 3. PROPOSED DEMAND FLOW IN UNIVERSITY VILLAGE

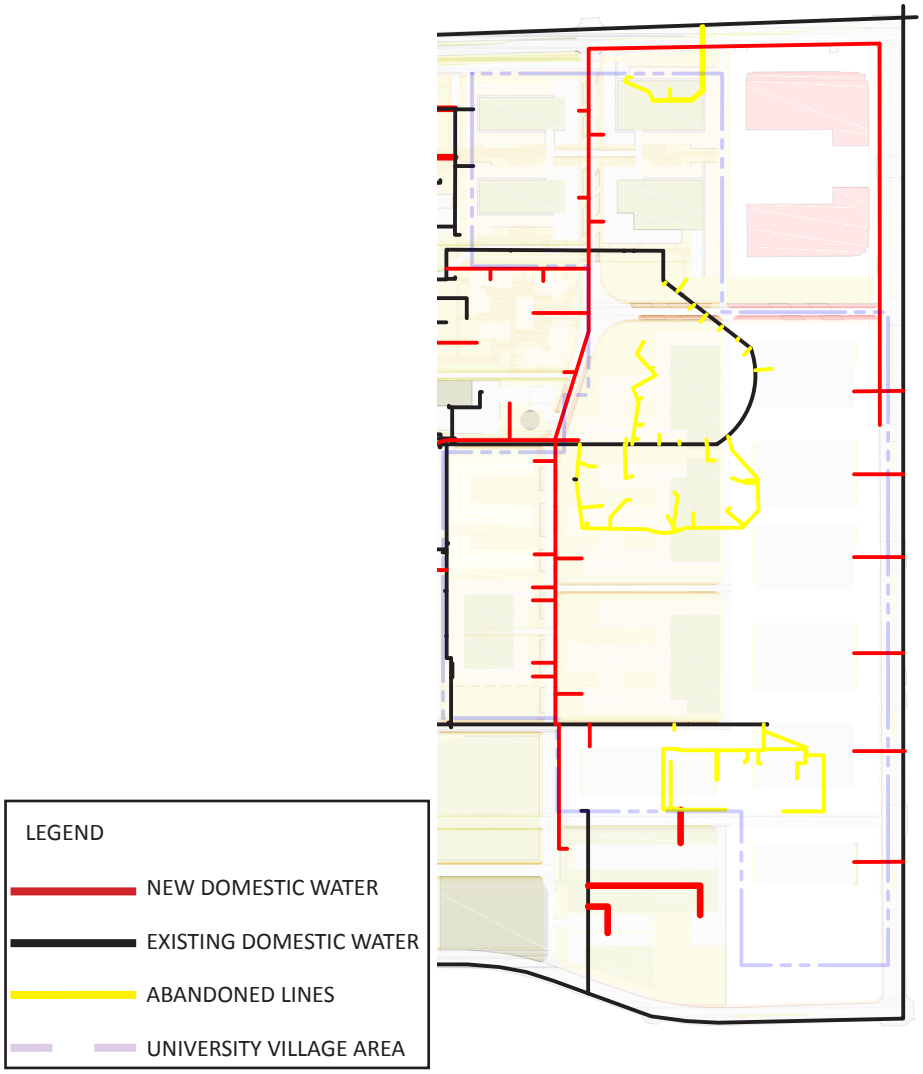


FIGURE 4. EXISTING AND NEW DOMESTIC WATER IN UNIVERSITY VILLAGE AREA

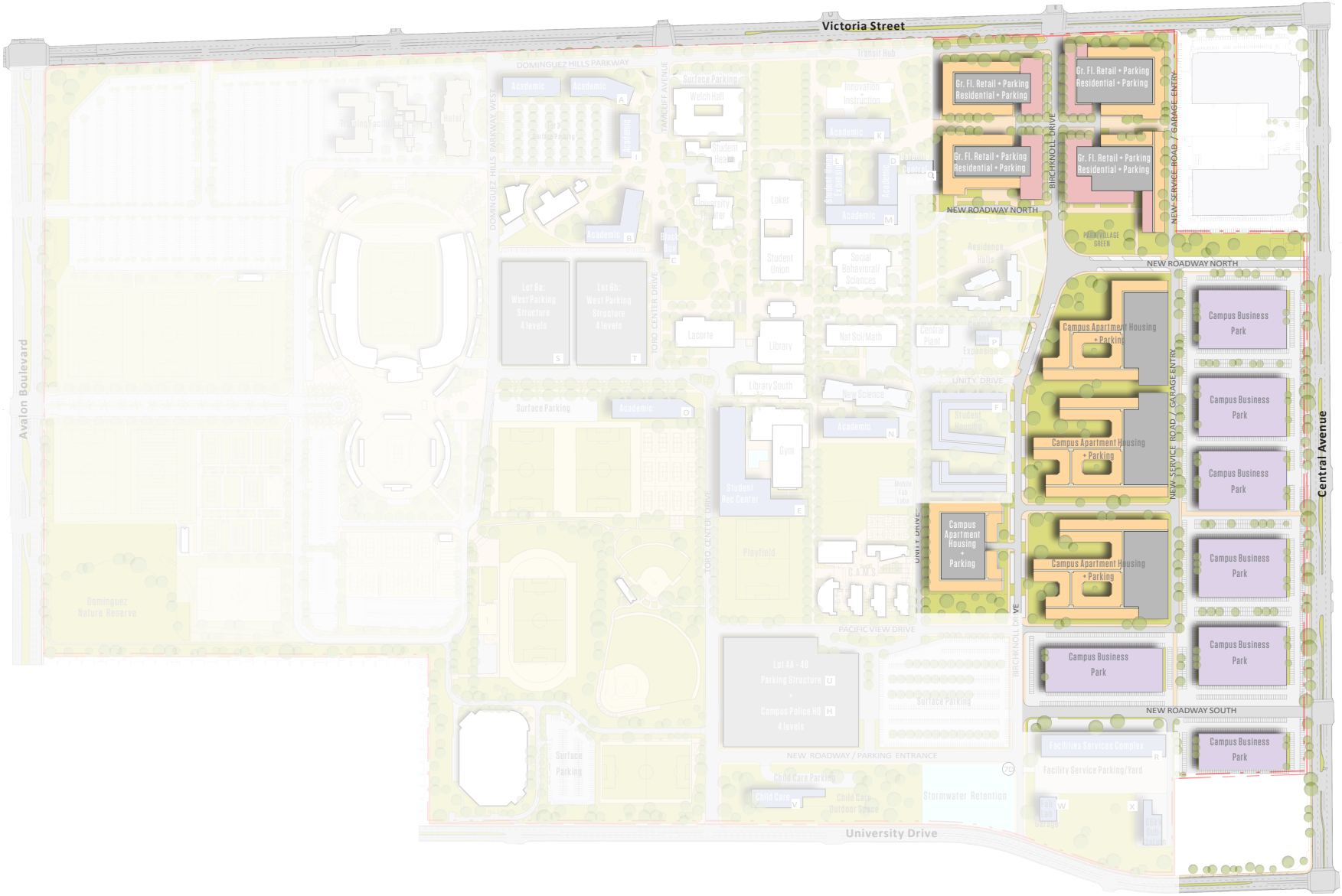


FIGURE 5. UNIVERSITY VILLAGE BUILDINGS

CAMPUS STORM DRAINAGE SYSTEM

STORM DRAINAGE INFRASTRUCTURE HIGHLIGHTS

PART-A: CORE CAMPUS

Core Area: 1.7 million GSF

Long term: allowable flow 1.52 cubic feet per second per acre (1.52 cfs/acre)

Strategy: Provide sufficient site area to retard storm water and reduce peak discharge rate to the capacity of the downstream receiving system.

CORE CAMPUS BUILDINGS LIST

A	Academic
B	Academic
C	Black Box Theatre
D	Academic
E	Rec Center
F	Student Apartments
I	Academic
J	Academic
K	Academic
L	Student Union Expansion
M	Academic
N	Academic
O	Academic
P	Central Plant Expansion
Q	Satellite Central Plant
R	Facilities Services Complex
V	Child Care
W	Fab Lab Garage
*	Residence Halls

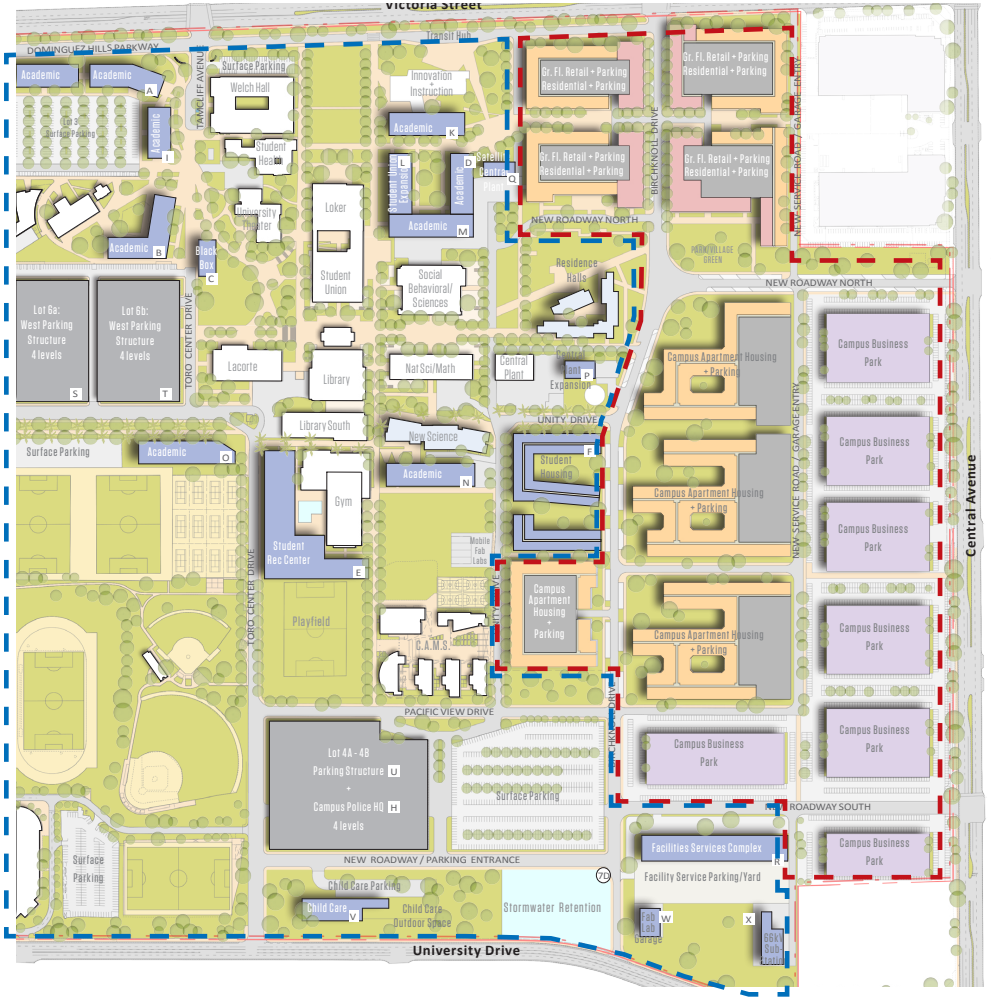


FIGURE 1. HIGHLIGHTS OF CAMPUS MASTER PLAN STORM DRAINAGE INFRASTRUCTURE

LEGEND
CORE CAMPUS
UNIVERSITY VILLAGE AREA

PLAN NORTH

PART-B: UNIVERSITY VILLAGE [UV]

UV Parking Area: 1.9 million GSF
UV Building Area: 3.8 million GSF

Strategy: Provide sufficient site area to retard storm water and reduce peak discharge rate to the capacity of the downstream receiving system. Each lot will drain separately to main lines in the development area. A restriction between the storage the parcels and main lines will limit discharge to the rate provided by the County.

UNIVERSITY VILLAGE - PROPOSED DEVELOPMENT

- Campus Apartment Housing
- Campus Business Park
- Retail

PART A: CORE CAMPUS STORM DRAINAGE INFRASTRUCTURE

A. EXISTING SYSTEMS

The existing storm drain system that serves the main portion of the University discharges through a 60-inch connection to a LA County Public Works storm drain on the south side of campus at University Drive and Campaign Drive. The Student Health Center (SHC # 25) has recurring issues with ponding in the parking area on the southwest side, often flooding the south entrance to the building. The SHC also experiences, to a lesser degree, ponding on the north side, which has been known to impact Welch Hall. On the east side of University Theater, the basement stairwell has had chronic problems with flooding, even in the smallest rain storm. A new sump-pump was installed several years ago, but is breaking down and unable to handle minor storm water discharges.

B. SYSTEM CHANGES UNDERWAY (APRIL 2017)

Existing downstream capacities are limited. Site designers of new projects must contact Los Angeles County Public Works to obtain requirements for limitations of discharge rates. Los Angeles County has limited storm water discharges to PD 0961 to 1.52 cubic feet per second (CFS) per acre drained during a 50-year storm event and prohibited discharges to PD 242 and MTD 1520.This requires retarding of storm water on-site to reduce peak discharges. The area listed under “Site Area required for Storm Water Mitigation Site Improvement, SF” should be considered a guideline only. Storage pipes can be constructed underground with lengths that produces volume sufficient for storage capacity.

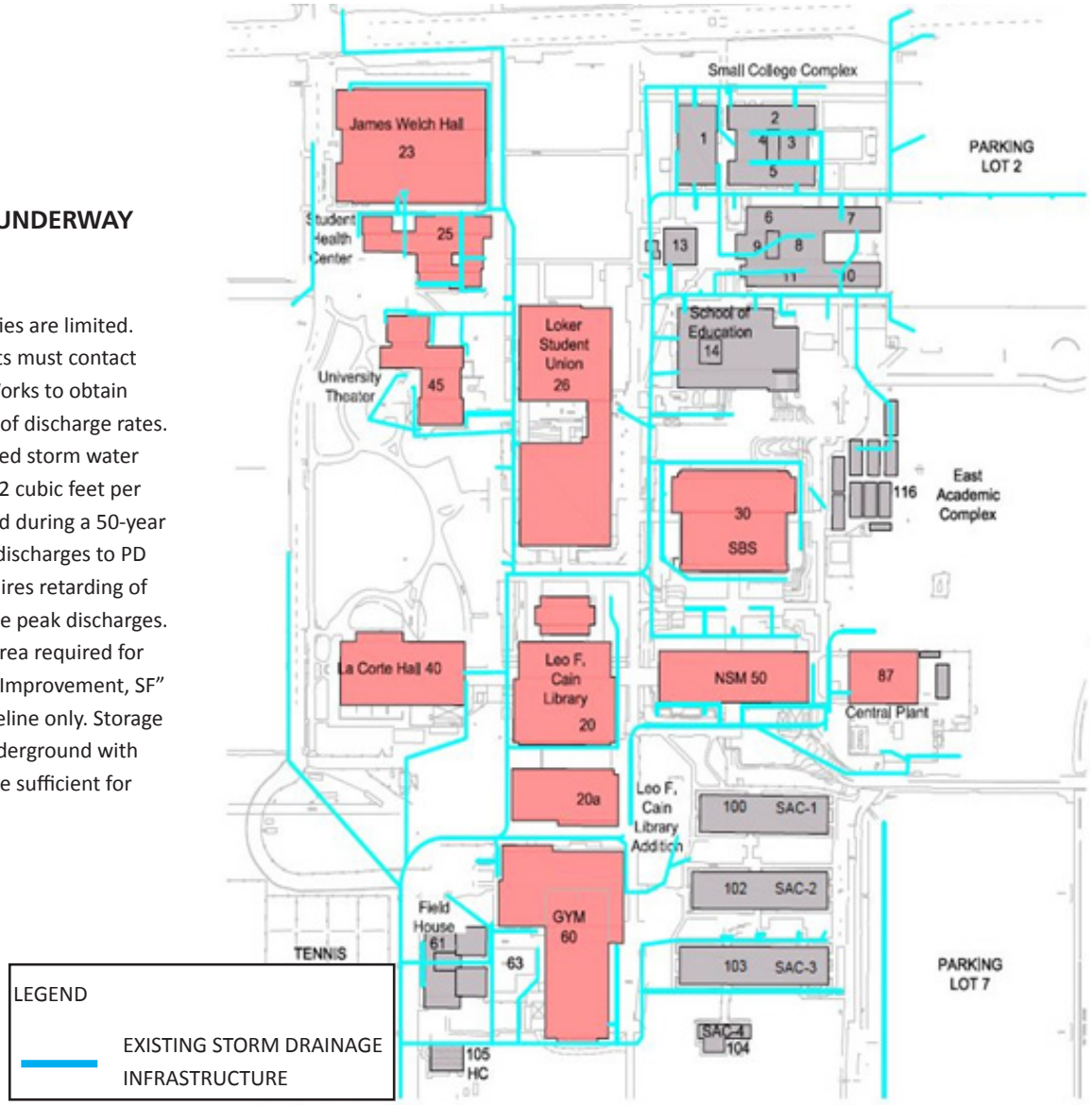


FIGURE 2. EXISTING STORM DRAINAGE INFRASTRUCTURE

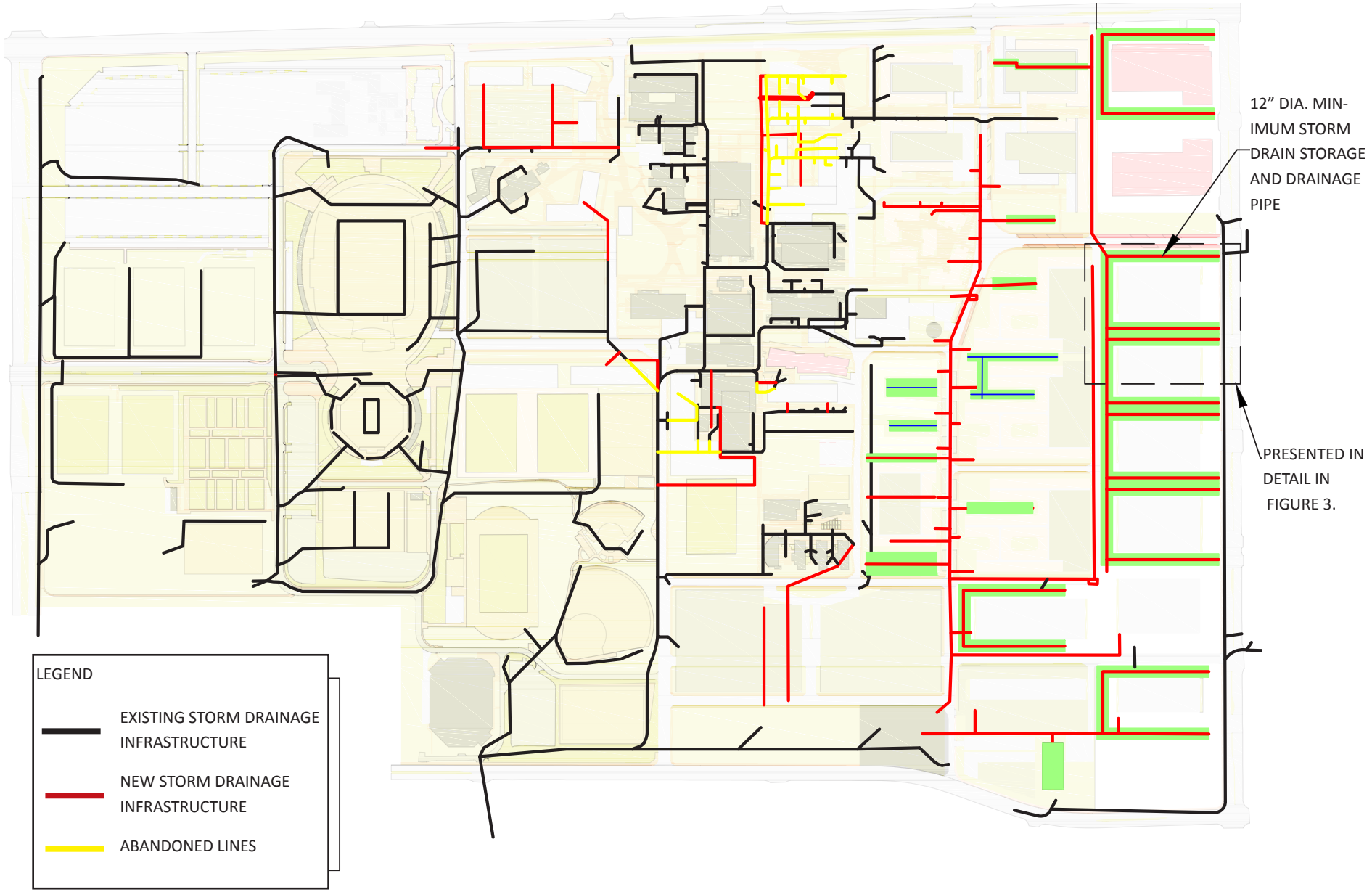


FIGURE 3. EXISTING AND NEW STORM DRAINAGE INFRASTRUCTURE

PART B: UNIVERSITY VILLAGE AREA STORM DRAINAGE INFRASTRUCTURE

As with the main campus, the new restriction by Los Angeles County limits storm water discharges to PD 0961 (County Constructed) to 1.52 cubic feet per second (CFS) per acre drained during a 50-year storm event and prohibits discharge to PD 242 and MTD 1520. This requires retarding of storm water on-site to reduce peak discharges.

Wheeler & Gray determined through hydrologic modeling using the Army Corps of Engineers' HEC-RAS program that attenuation of peak discharges from upstream parcels to downstream parcels would be impractical. It would require large areas and/or volumes to be retarded at each parcel before discharging to a downstream parcel. This scheme was not pursued because modeling showed flooding when using planter volumes typical for commercial developments.

Instead, Wheeler & Gray determined the peak discharge from a typical parcel using Los Angeles County Department of Public Works' HydroCalc 1.0.2 modeling software to produce a hydrograph for a small area. The typical parcel used is campus business park 1 of the University Village Plan. The area of the site in acres was multiplied by 1.52 CFS/Acre to determine the peak allowable discharge for a site of the size of this typical parcel. In the case of the example presented in this Master Plan, that rate is 6.56 CFS. A line at this rate was drawn across the hydrograph to show the volume of discharge that is required to be stored on site. The volume calculated is 2,305 cubic feet (CF). This volume can be stored within the concept planter area, which was assumed will be constructed at an invert slope of 0.5%, and approximately 1,200 feet of 18-inch diameter pipe.

For each site, storage pipes can be constructed under parking lots and driveways to provide sufficient storage capacity. The pipe will also serve to drain the buildings and parking lots.

Each lot will drain separately to main lines in the development area. A restriction between the storage the parcels and main lines will limit discharge to the rate provided by the County.

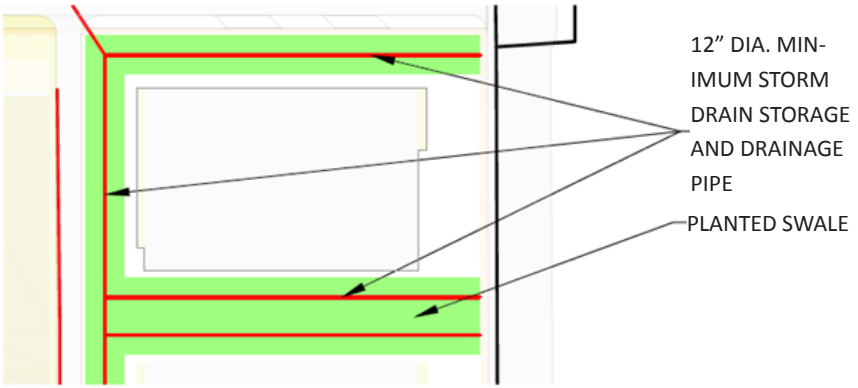


FIGURE 4. DETAIL OF STORM DRAIN STORAGE AND DRAINAGE PIPE

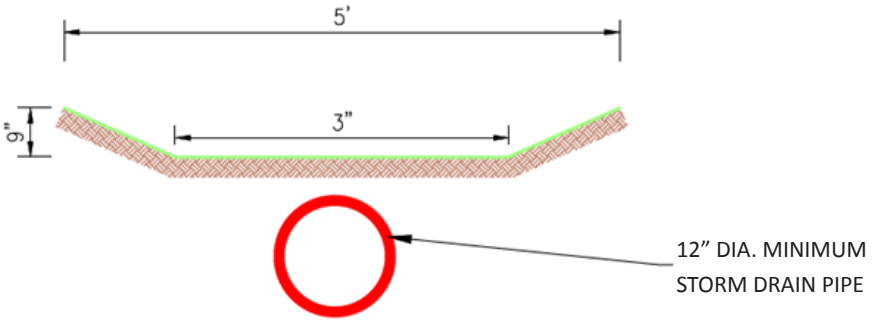


FIGURE 5. CROSS SECTION OF PLANTED SWALE

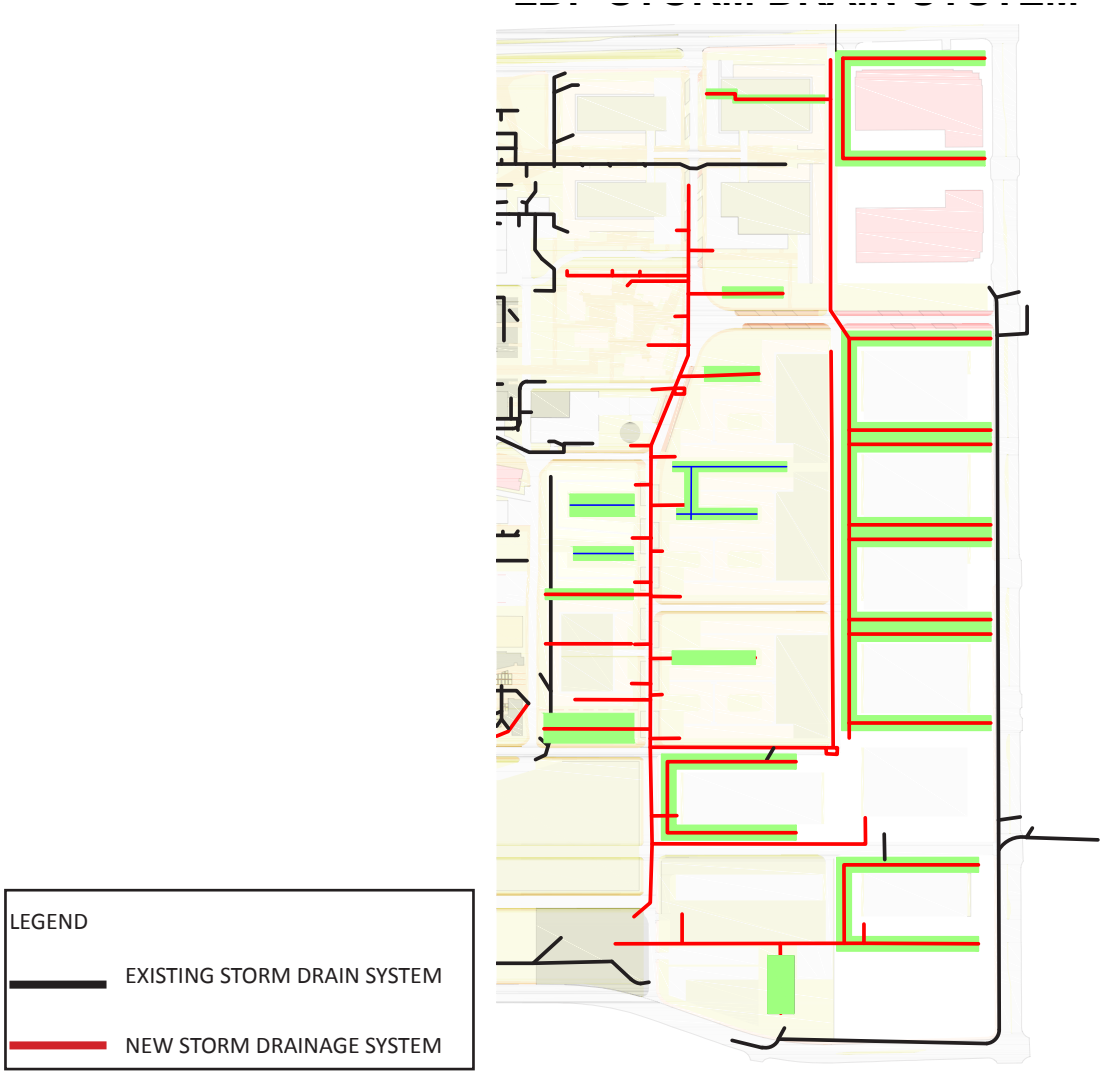
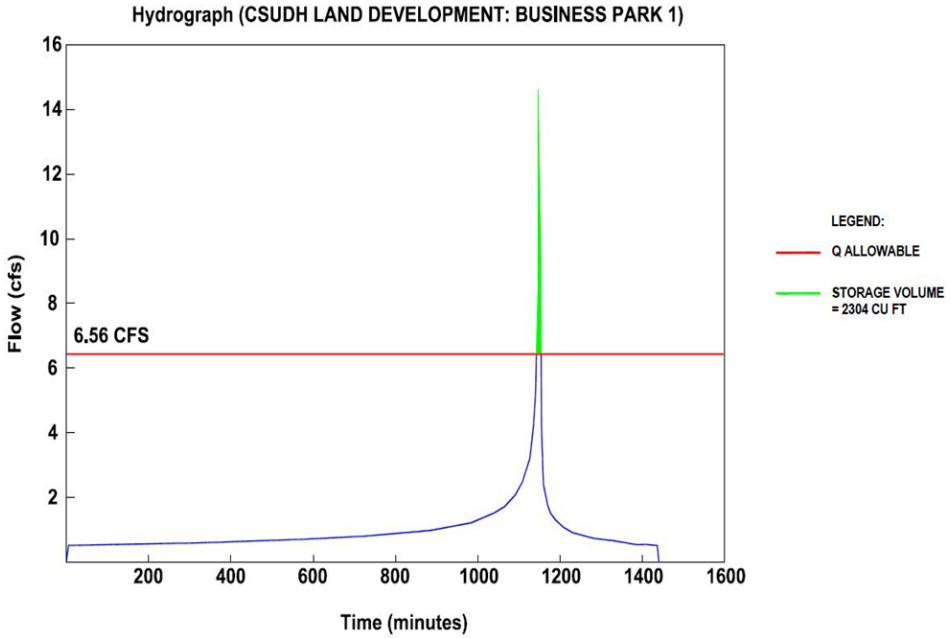


FIGURE 6. UNIVERSITY VILLAGE AREA EXISTING AND NEW STORM DRAIN SYSTEM

Input Parameters	
Project Name	CSUDH Land Development
Subarea ID	Business Park 1
Area (ac)	4.32
Flow Path Length (ft)	436.0
Flow Path Slope (vft/hft)	0.018
50-yr Rainfall Depth (in)	6.3
Percent Impervious	0.91
Soil Type	9
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results	
Modeled (50-yr) Rainfall Depth (in)	6.3
Peak Intensity (in/hr)	3.7588
Undeveloped Runoff Coefficient (Cu)	0.9153
Developed Runoff Coefficient (Cd)	0.9
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	14.614
Burned Peak Flow Rate (cfs)	14.614
24-Hr Clear Runoff Volume (ac-ft)	1.8863
24-Hr Clear Runoff Volume (cu-ft)	82167.2928

TABLE 1. PEAK FLOW HYDROGRAPHIC ANALYSIS



GRAPH 1. GRAPH DEPICTING HYDROGRAPH CALCULATED FOR CAMPUS BUSINESS PARK 1

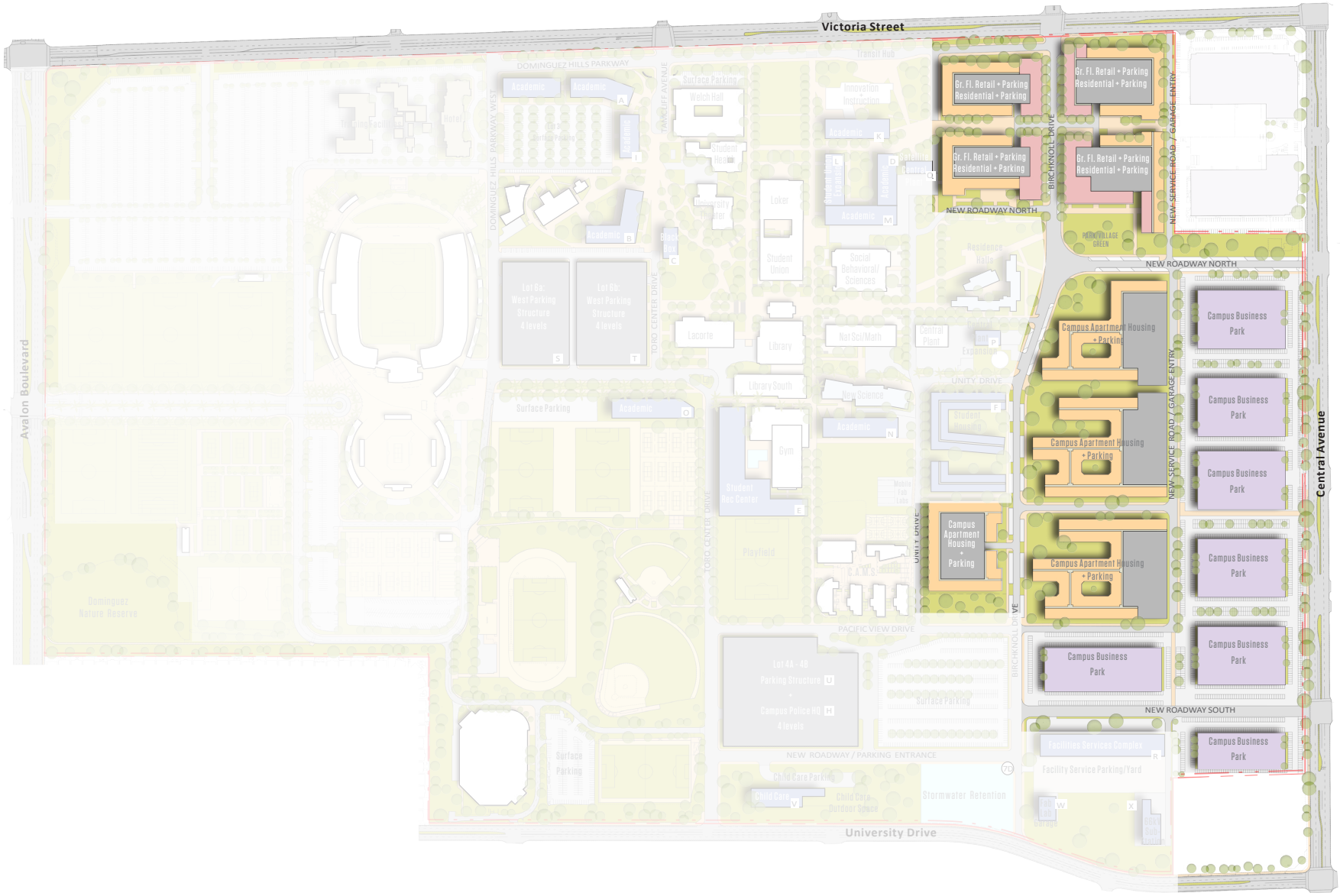


FIGURE 7. UNIVERSITY VILLAGE BUILDINGS

Appendix C: University Village Design Guidelines

The **University Village** is an urban design concept within the CSUDH 2018 Master Plan that integrates the academic core and the student residential community with a neighborhood of retail and business communities and campus apartment housing to create a live/work/play environment with synergistic connections to the University's mission and purpose. Unless otherwise noted, the Design Guidelines analyses and reports appearing in this Appendix address all the parcels of the University Village.

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California State University Dominguez Hills:

University Village Conceptual Development Framework:

Design Guidelines

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Table of Contents

List of Exhibits

C.1 INTRODUCTION, VISION & APPLICATION

CSU Dominguez Hills (CSUDH), in conjunction with the California State University (CSU) system, intends to enter into agreements with land and real estate developers to develop approximately 76.5 acres located along the eastern side of the CSUDH campus property including campus apartment housing, retail and campus business park uses. The University Village conceptual development framework is conceived as a new vibrant neighborhood integrated with the University Core Campus. The 76.5-acre project site is shown on Exhibit C-2. Envisioned as a public-private partnership (P3), the University Village will be incrementally developed over a span of several years. The University Village concept and layout as depicted in this set of Design Guidelines represents a possible scenario for developing the 76.5 acres of CSUDH land. Other development scenarios for the land are possible to be delineated by future developers working with CSUDH. The mix, density and location of the land uses and building types shown on the Illustrative Plan for the University Village area are conceptual in nature and were determined through a collaborative process between CSUDH, the strategic real estate planning firm of RCLCO, the planning and architecture firm of AC Martin Partners, Inc. and AC Martin's affiliate housing design firm, Togawa Smith Martin Residential. The transportation/traffic/parking engineering firm of Fehr & Peers consulted on various aspects of the circulation and parking analysis for the University Village. The Illustrative Plan shown in this Appendix and in chapters of the CSUDH Guidelines for 2018 Master Plan describe the intended land uses, approximate densities and intended vehicle circulation, open space and landscape approaches for accomplishing the CSUDH vision for the University Village. Variations on this University Village Illustrative Plan will be reviewed with respect to ascertaining that proposed development scenarios fulfill the intentions of CSU Dominguez Hills.

VISION FOR THE UNIVERSITY VILLAGE PROJECT

The University Village Project at CSUDH is envisioned as a pedestrian-oriented village adjacent to and interconnected with the CSU Dominguez Hills core campus. The multiple buildings to be constructed in the University Village will provide: retail uses convenient to CSUDH students, faculty and staff and the community; residential uses for faculty, staff and the local community; and a series of campus business park spaces that complement the mission of the University by providing research partner-

ships, internships, employment and business incubator/accelerator opportunities for CSUDH students and faculty. At its heart the University Village will be easily accessible and walkable, creating a congenial 'town-gown' relationship between CSUDH and a small, unique residential/retail/business neighborhood within the northeast part of the City of Carson. Birchknoll Drive at Victoria Street will serve as the gateway into University Village at the Village Center retail area and will serve as the neighborhood's main street lined with birch trees. The Village Center will also be linked by a less than 5-minute westward walk to the central core of CSUDH via a pedestrian pathway "Olive Walk." In keeping with the relatively small scale of the development, the experience of the University Village area by the pedestrian will be a pleasant one with buildings moderately set back from Birchknoll Drive, and the resulting street-scape exhibiting a selection of trees and shrubs similar to those found on the CSUDH campus. A series of campus business park buildings will be developed along the eastern edge of the University Village, complementary to the existing light industrial uses to the east across Central Avenue. This new campus business park will be accessed by vehicles from Central Avenue but accessible by foot to University Village Center and the CSUDH Core Campus.

Fundamental to the University Village vision is the concept of sustainability: environmental sustainability, financial sustainability and institutional sustainability. As a member of the larger community, CSUDH promotes environmental sustainability through its academic curriculum and the varied actions it takes in the stewardship of its multiple assets including its University Village project assets. Financially, the University Village is a project that has been optimally matched to the market demand for a mix of land uses, densities and building types that can generate income streams sufficient to ensure a sustained return for the University and the site developers. The University Village is ultimately a project that strengthens CSUDH as an institution by creating a sustainable stream of revenues to support the University's educational mission while creating a new neighborhood adjacent to CSUDH that, through residential, social and business opportunities, directly supports CSUDH's mission in the community.

Site Vision

The University Village site, located immediately adjacent to the east of the core campus of California State University, Dominguez Hills, has the natural potential to create educational, social and economic opportunities that would flow back to the main CSUDH campus. Various subareas within University Village also possess intrinsic qualities that, based on a combination of market forces, adjacent uses and on-site resources, suggest a mix and location of land uses and building types that optimally take advantage of those intrinsic qualities. An important on-site resource that is recognized in these Design Guidelines are the views to the south that encompass the Port of

Landscape Vision

The landscape design guidelines developed for the University Village are integrated with and take cues from the CSUDH 2018 Landscape Guidelines, described and illustrated in Chapter 5 of the Guidelines for 2018 Master Plan. Among the features shared by both sets of design guidelines is an emphasis on bio-diversity and the creation and support of landscape to support the goals of sustainability as well as providing a backdrop for the built environment and campus and University Village activities. Several signature tree types found on and planned for the CSUDH campus are included in the University Village landscape plan, visually and even biologically linking Village and campus.

Architectural Vision

Three principal building types are anticipated for University Village:

- Moderate density campus apartment housing (average 40-50 du/acre);
- Buildings consisting of residential apartments built over ground-level retail, restaurants and neighborhood-serving services;
- Campus business park or possibly low-rise offices.

In general parking will be developed in parking structures and in most cases, 'wrapped' by residential and/or ground level retail uses. Surface parking will be provided for the campus business park area [although two or three-level parking structures could be introduced to serve limited low-rise office development].

Utilities Vision

Site utilities will be placed underground. Related surface equipment will be shielded from public view in a manner harmonious with the adjacent primary buildings. Impacts related to noise-producing equipment will be shielded from adjacent public and private areas. Site lighting levels will ensure security and contribute to the nighttime character of the adjacent land uses and buildings while encouraging the evening use of buildings, pedestrian pathways and open space areas.

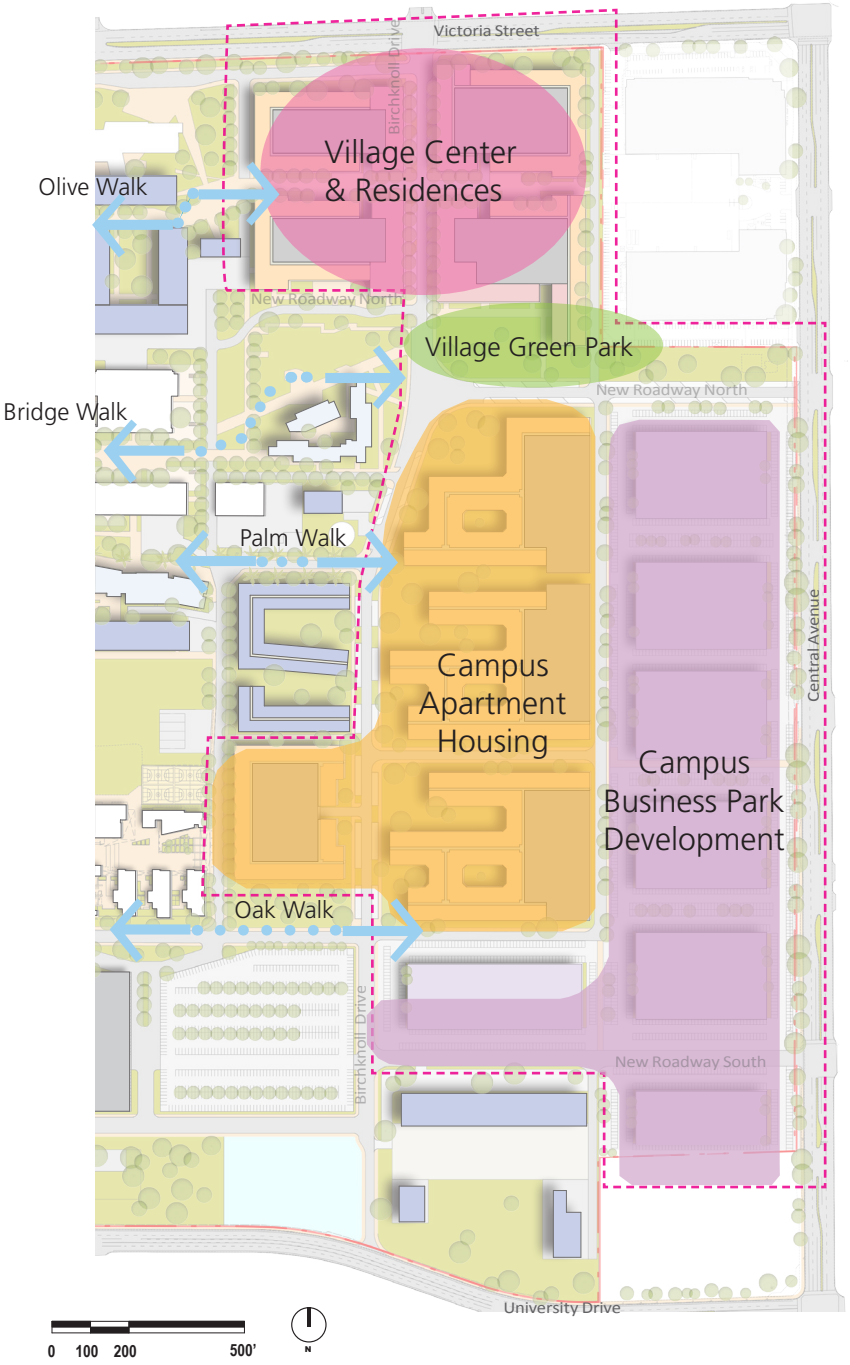
KEY ASSUMPTIONS RELATED TO THE UNIVERSITY VILLAGE DEVELOPMENT

The following assumptions had been made related to the development model illustrated in these Design Guidelines (Exhibit C-2) identified as the University Village Illustrative Plan.

- Streets and related buried utilities internal to the project would be constructed and maintained as part of the University Village as determined by the governing development agreements.
- The University Village Illustrative Plan depicts a series of conceptual development projects as potentially built on conceptual land parcels (Exhibits C-1 and C-2). When the land parcels are officially surveyed to provide metes and bounds, the resulting parcel boundaries shall be considered equivalent to property lines when evaluating projects for compliance with building code issues under CalGreen (e.g. to determine light pollution reduction impacts).
- Development uses associated with the University Village model illustrated in these Design Guidelines were assumed as those identified on Exhibits C-1 and C-2. It is assumed that the ultimate development parameters in terms of the number of units, total development gross square feet and number of automobiles parked will not exceed the totals for these parameters as shown on Exhibit C-3. It is further assumed that the final configuration of individual land parcels may vary from those on Exhibit C-2 in terms of the densities and/or development building types (number of floors, total square feet, parking ratios) as long as the totals for the entire University Village site would not exceed the overall totals listed on Exhibit C-3.

Exhibit C-1:

University Village Concept

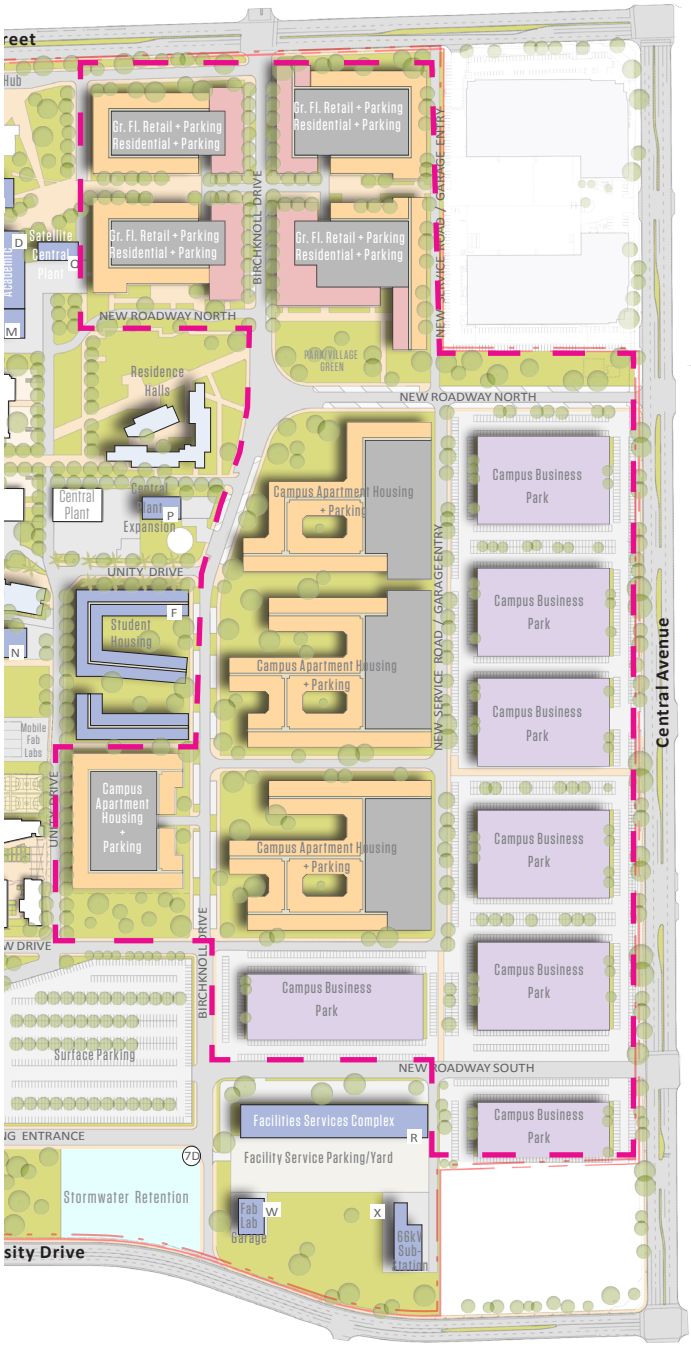


UNIVERSITY VILLAGE PLAN KEY

- CAMPUS APARTMENT HOUSING
- GROUND FLOOR RETAIL + RESIDENTIAL
- CAMPUS BUSINESS PARK
- MAJOR PEDESTRIAN CONNECTIONS WITH THE CAMPUS CORE
- UNIVERSITY VILLAGE AREA

Exhibit C-2:

University Village Illustrative Plan



UNIVERSITY VILLAGE CONCEPTUAL DEVELOPMENT FRAMEWORK	
	UP TO:
Total Campus Apartment Housing	2,149 units
Total Campus Business Park	720,918 gsf
Total Retail	96,085 gsf

Exhibit C-3: Universirt Village Proposed Development

UNIVERSITY VILLAGE PLAN KEY

- CAMPUS APARTMENT HOUSING
- GROUND FLOOR RETAIL + RESIDENTIAL
- CAMPUS BUSINESS PARK
- PARKING STRUCTURE
- SURFACE PARKING
- UNIVERSITY VILLAGE

- The combined site composed of the ground-floor-retail-residential-parking development south of Victoria Street is envisioned as the University Village Center and would be developed and graded as a single site to achieve a more uniform pedestrian experience and to ease pedestrian access across the Village Center. The facing retail frontages and sidewalks along Birchknoll Drive would be developed at similar elevations/levels to promote pedestrian activity and maintain ADA accessibility.
- A master plan for utility support infrastructure needed for the University Village project and area was developed by an engineering team consisting of the firms Digital Energy Inc., Power Engineering Services, Inc. (PES) and Wheeler & Gray to identify the magnitude of anticipated loads and the configuration of systems that could serve the mix and density of land uses shown on the University Village Illustrative Plan (Exhibit C-2). It is recognized that other approaches to servicing the utility needs may be proposed when actual projects are designed and developed for the individual parcels as subject to the future governing development agreements.
- Sustainable Design: The University Village is intended to achieve primary sustainability through design and construction that follows the California building codes and specifically CalGreen, the California Green Building Standards Code. Over time, the California codes have continued to require increasingly higher levels of sustainable design resulting in buildings and projects being built to significantly higher standards of sustainability. In support of this trend, the Design Guidelines promote higher levels of sustainability by pointing to design measures that can easily be achieved in the University Village area such as the use of solar PV, solar domestic water heating and solar process heating systems, provision of bicycle lanes on Universtiy Village streets and construction of cool roofs.

APPLICATION OF THE UNIVERSITY VILLAGE DEVELOPMENT DESIGN GUIDELINES

The University Village Design Guidelines are intended to give planning and design guidance to future developers of the project. The Design Guidelines are intended to assist developers in achieving the vision developed by CSUDH aimed at creating a vibrant and successful University Village retail and residential development. The Design Guidelines seek to provide a basic direction to what the University Village area is envisioned to become as well as minimum standards for development where such standards are needed to ensure that key development initiatives as envisioned by CSUDH and its constituent communities will be implemented in the future.

When applying the Design Guidelines to projects proposed for the University Village area, key operational words used in the Design Guidelines carry with them these associated definitions:

- Encouraged —those actions that, if followed, would generally result in a superior project.
- Should—those actions that, under most conditions, would be appropriate to ensuring a project that fulfills the University Village vision.
- Shall—those actions that are required to ensure that a project fulfills the University Village vision.

The Design Guidelines are not intended to restrict the creativity of the architects and engineers who will ultimately design the various projects to be developed on the land. At the same time, given the range of physical, building-type, financial and market-oriented opportunities and constraints of the University Village, it is believed that the Design Guidelines present a best approach to suggesting and specifying the direction for site development, architectural design, landscape design and engineering design for the University Village area to meet and fulfill the vision of CSUDH.

Individual construction projects proposed for the University Village area will be reviewed for code compliance by CSUDH and/or its designatees (referred to here as the “approving authority”). The University Village Design Guidelines will be used by the approving authority to determine whether a given project meets the intent of the original planning team (CSUDH’s leadership and the team of real estate, planning, architecture and engineering professionals).

THE UNIVERSITY VILLAGE DESIGN GUIDELINES AND THE CSUDH 2018 MASTER PLAN

The University Village is located on land owned by the California State University system and therefore are included in the CSUDH 2018 Master Plan which incorporates plans for all state-owned property designated as part of CSU Dominguez Hills. The CSUDH 2018 Master Plan envisions the University Village as a vital part of the campus and adjoining community: a destination for social activities associated with the retail shops and restaurants of the Village Center and Village Green Park; a living environment and neighborhood where students, faculty, staff and Carson community residents live and participate in CSUDH activities; and through the campus business park area, a place supporting business uses that are synergistic with and supportive of CSUDH's educational mission and development goals. Various planning initiatives contained within the CSUDH 2018 Master Plan, including the Landscape Guidelines and in particular the pedestrian walkway corridors (Chapter 5, pp. 109-112); the campus Transportation, Circulation and Parking plan (Chapter 4, pp. 76-93;) and the new CSUDH student housing plan (Chapter 4, p. 73), have components which directly engage and affect the University Village. The intent and specific elements of the most important of these initiatives have been brought into the University Village Design Guidelines to assist developers and others understand the functional and mission-related context in which the University Village is situated. Users of the Design Guidelines are encouraged to review the Guidelines for 2018 Master Plan and its other Appendices for further information potentially useful to their planning and design activities.

PRINCIPAL GOALS OF THE DESIGN GUIDELINES

- Inform future developers of the University Village conceptual development framework and the essential characteristics to be achieved for the development in terms of design intent, features and quality.
- Provide further basis for evaluation of the project needed to complete the Environmental Impact Report (EIR) associated with the 2018 CSUDH Master Plan that incorporates a master plan for the University Village project area.

Exhibit C-4: Artist's Rendering looking north over University Village, comprising of a mix of land uses including apartments (foreground), a retail Village Center (top of illustration and Exhibit C-5) and a campus business park (at right). With a potential addition of over 2,000 dwelling units the strong multi-family residential character of the planned neighborhood is evident. The artist's rendering is centered on an extended Birchknoll Drive, with the core CSUDH campus at the upper left.

Exhibit C-5: Artist's Rendering of University Village ground-floor-retail, residential, and parking development; looking south from Victoria Street, showing the development along the Dominguez Hills Parkway frontage road and entering the Village Center along Birchknoll Drive.

C.2 SITE DEVELOPMENT GUIDELINES

OVERALL GUIDELINES FOR THE UNIVERSITY VILLAGE SITE

- Development shall create a pedestrian-oriented 'village' atmosphere functionally connected to the CSUDH Core Campus.
- Pedestrian access to the CSUDH campus shall be facilitated by sidewalks adjacent to all University Village streets.
- Each building should be designed recognizing the aesthetic strengths intrinsic to its specific development site and parcel (e.g. views from the University Village area to San Pedro and the Palos Verdes Peninsula; functional connections to adjacent projects/facilities/roadways).
- Parking structures and parking lots shall not be visible from major public streets (Birchknoll Drive, Victoria Street, New Roadway North, Pacific View Drive). In general the intent is to use 'wrapped'/concealed parking garage residential construction techniques to achieve the levels of residential and ground-floor-retail-residential-parking densities planned for the University Village.
- Major utility infrastructure requiring above-ground equipment and facilities such as electrical substations shall be identified as to the probable size and location prior to development of any of the University Village area so that these can be properly screened and otherwise integrated into the plan.

Site Grading

- Site grading is likely to occur on a phased basis as the University Village is developed over time. Slopes may be created between development parcels. Such grading may influence the development character of subsequent adjoining development parcels. The resulting views, access, landscaping and drainage opportunities and constraints should be evaluated at each step in the development process as grading proceeds.
- The combined site composed of the ground-floor-retail-residential-parking development south of Victoria Street is envisioned as the University Village Center and would be developed and graded as a single site to achieve a more uniform pedestrian experience and to ease pedestrian access across the Village Center. The facing retail frontages and sidewalks along Birchknoll Drive would be developed at similar elevations/levels to promote pedestrian activity and maintain ADA accessibility.
- Olive Walk connecting the CSUDH campus core with the University Village Center and extending to the east portions of the ground-floor-retail-residential-parking development should be developed and graded as a continuous minimum 20-foot wide walkway not exceeding a 5% slope. Stairs, switchback transitions and hand rails should not be used to achieve ADA accessibility along Olive Walk.

- The site transition between the University Village and the CSUDH campus should be created through grading. Graded and appropriately landscaped slopes are permitted. Retaining walls transitions in these areas are prohibited.

Separation of Uses

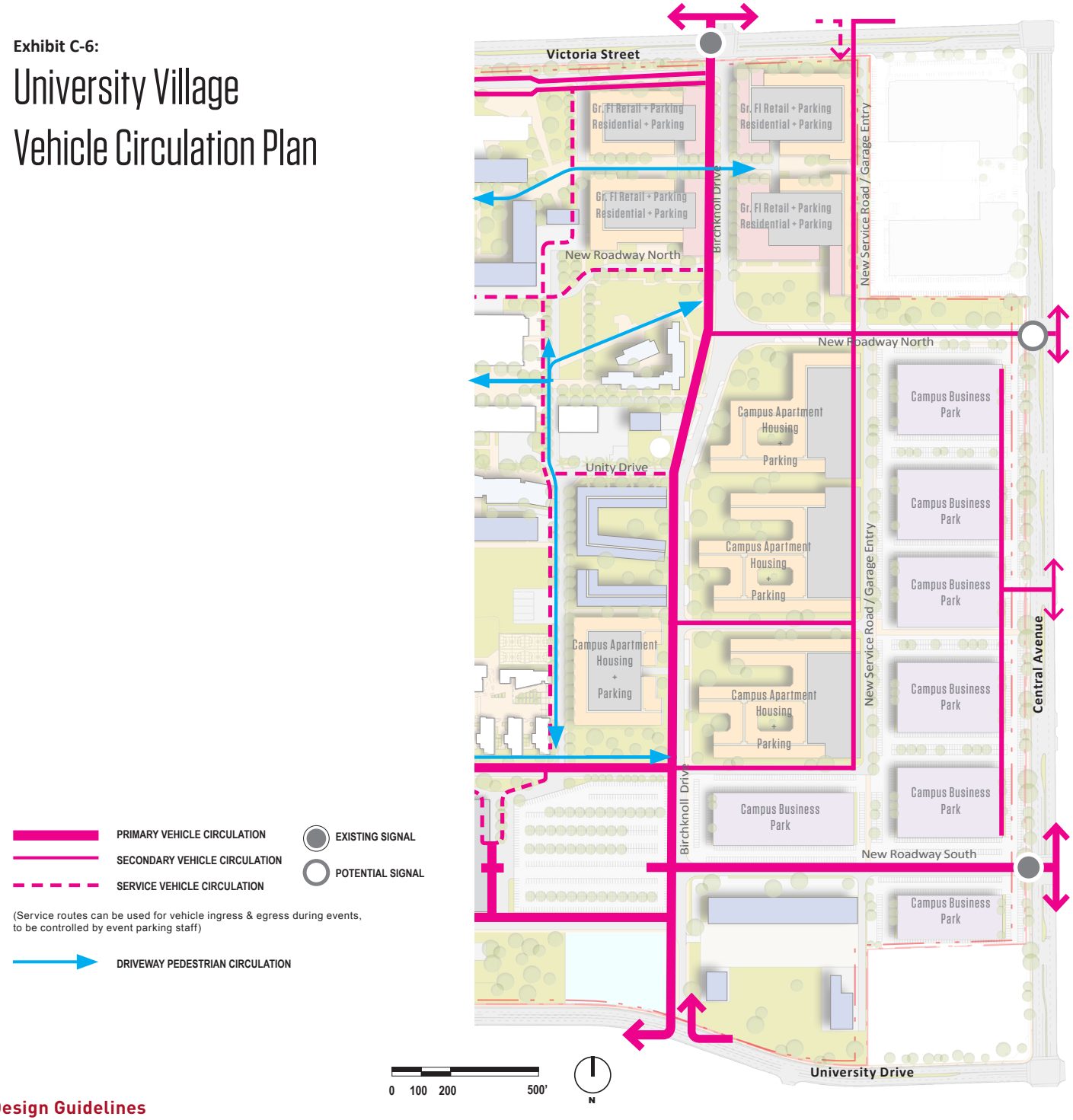
Partially exposed parking structures are permissible along the east edges of the ground-floor-retail-residential-parking development. These structures are intended to be accessed by a north-south 24-foot wide service road that would also provide service to the Campus Business Park. To visually buffer these parking structures from neighboring uses a minimum 5-foot wide planting strip shall be created along the east edges of the ground-floor-retail-residential and parking development.

VEHICLE CIRCULATION

The University Village development is centered around Birchknoll Drive and its extension to the south, where it is inteded to intersect with University Drive. Two existing east and west roadways, New Roadway North and New Roadway South are extended from Central Avenue to the west to provide additional vehicle access. Exhibit C-6 shows a conceptual vehicle circulation plan for the University Village site, including primary, secondary

Exhibit C-6:

University Village Vehicle Circulation Plan



Crosswalks will be an important part of the pedestrian circulation system for the University Village. High visibility continental crosswalks are appropriate for installation at intersections or mid-block with optional lighting alert systems possible for added safety.

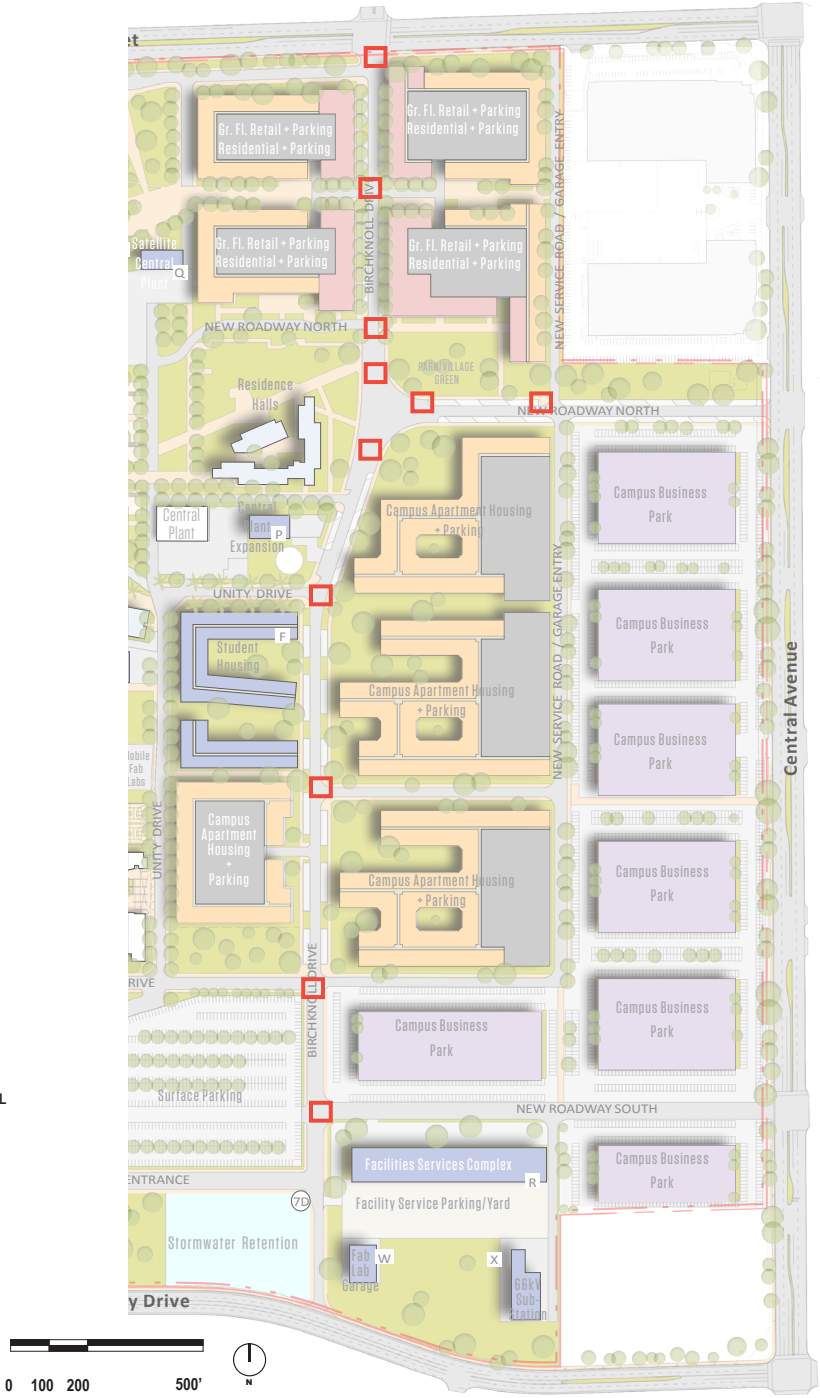
and traffic signals. Street section diagrams and other information describing the vehicle circulation system are found in Section C.4.

Crosswalks

Birchknoll Drive has one vehicle travel lane in each direction and a maximum operating speed of 30 miles per hour. In this context high visibility continental crosswalks are appropriate for installation at intersections or mid-block. In many campus settings (e.g., Cal State Long Beach), additional visibility treatments – such as retro-reflective signs, in-pavement reflectors, or stop signs, are also installed. The crosswalks illustrated in Exhibit C-7 are spaced between 300 and 500 feet apart, appropriate distances for an area with high pedestrian volume.

Exhibit C-7:

Proposed Crosswalks



and service vehicle circulation.

Bikeways

Class II Bike Lanes shall be incorporated into the University Village roadways as indicated on Exhibit C-8 “University Village Bikeways.” These proposed bicycle routes are consistent with the Regional Bike Plan in the Carson area. See the CSUDH 2018

Exhibit C-8:

University Village Bikeways

UNIVERSITY VILLAGE PLAN KEY

- CLASS I BIKE PATH
- CLASS II BIKE LANES (5-FEET MIN)
- CLASS III BIKE ROUTE
- CAMPUS APARTMENT HOUSING
- GROUND FLOOR RETAIL & RESIDENTIAL
- CAMPUS BUSINESS PARK
- PARKING STRUCTURE
- SURFACE PARKING

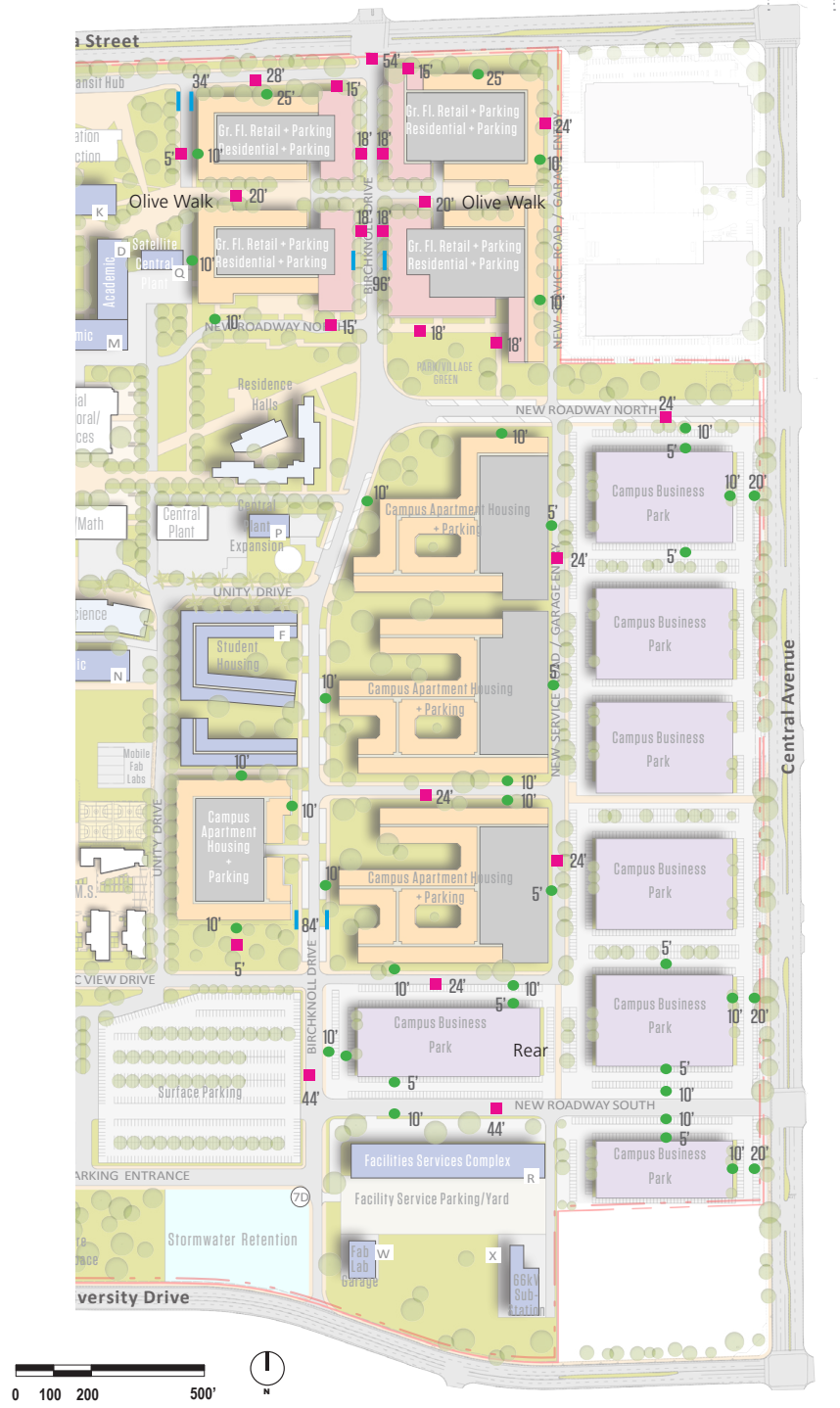
Residential Streets, Setbacks and Landscape Systems

Birchknoll Drive south of New Roadway North and New Roadway North itself are intended to be residentially oriented streets visually defined by limiting the amount of paved space and maximizing the presence of street trees and other landscaping. These streets and adjacent sidewalks are intended to support low speed vehicular traffic, bicycle travel and pedestrian connections throughout University Village. The Landscape Architectural Design Guidelines, Section C.4, illustrate cross-sectional street configurations that accomplish these overall goals—they include sidewalks on both sides, periodic street parking in bays or parallel spaces, bike lanes and vehicular lanes of travel. Other alternative approaches are possible but the total cross-sectional roadway and adjacent sidewalk/parkway distance shall not exceed 84-feet (Exhibit C-9). In general, because the overall goal to accommodate tenant and visitor guest parking in the concealed parking structures, it may be possible to reduce or eliminate much of the street parking on Birchknoll Drive south of New Roadway North.

The residential character of the University Village as experienced from Birchknoll Drive south of Village Center will in part be defined by a front yard landscape system created by through a recommended minimum 10-foot setback of buildings from the back-of-sidewalk along Birchknoll Drive and New Roadway North (Exhibit C-9).

Exhibit C-9:

Recommended Minimum Circulation Setback and Landscape Dimensions



Master Plan report, Chapter 4, page 89.

Pathways

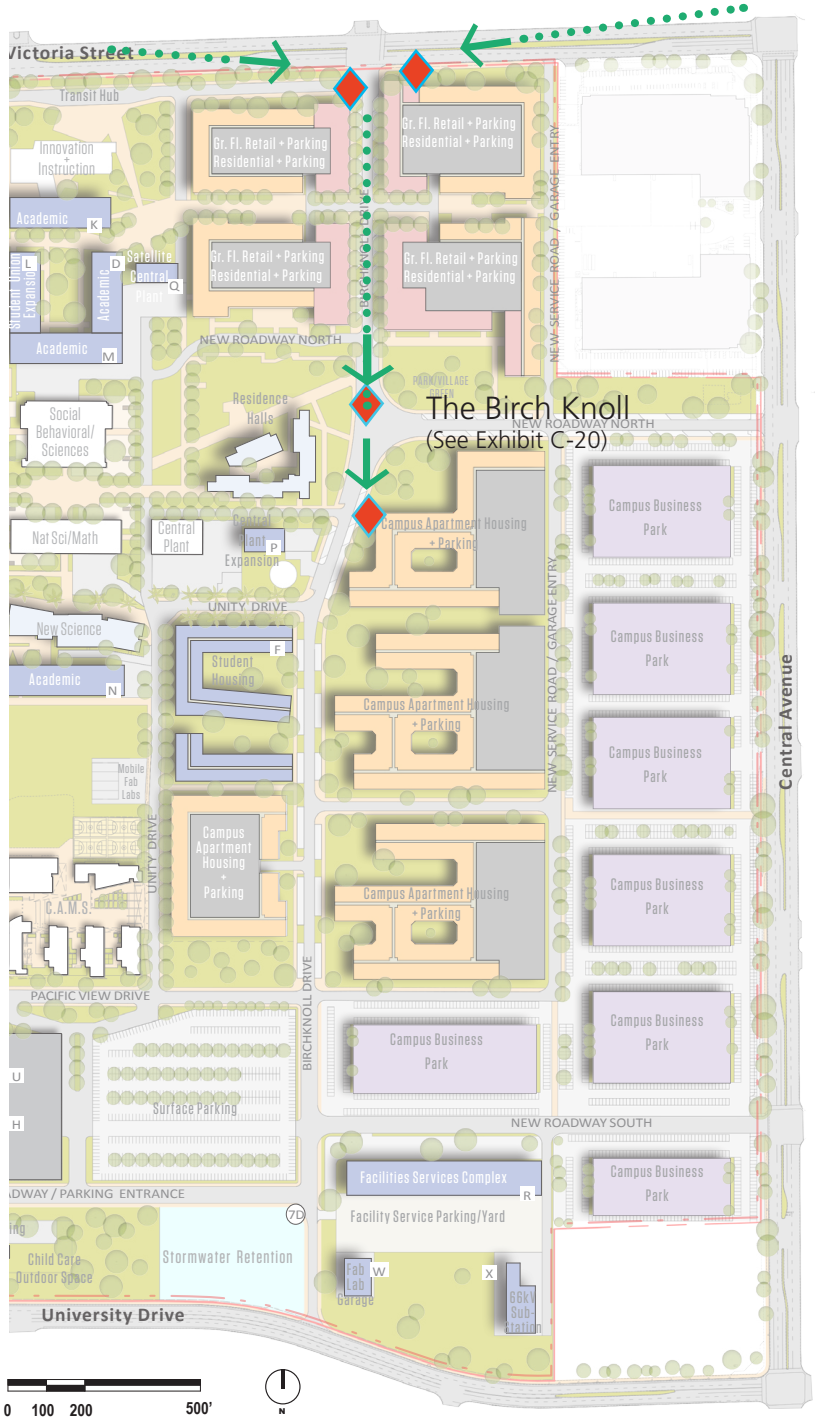
Pedestrian pathways should be considered to link the Campus Business Park with Birchknoll Drive.

CREATING LANDMARKS

Prominent and recognizable architectural and landscape elements can serve as landmarks in the community, creating a sense of place and providing visual aids to navigation. Building architectural features with a vertical component like a 'turret' or clock towers and/or building corner expressions of form, materials and colors can create visual landmarks in the neighborhood. Exhibit C-10 identifies the locations where architectural landmarks should occur in University Village. The indicated landmark locations along Victoria Street would serve to identify University Village as viewed from the outside community; the locations near the center of University Village including The Birch Knoll roundabout (see Section C.4) are intended to be on-axis with Birchknoll Drive and would serve as landmarks and orientation features within University Village itself. Additionally, the 'Village Green Park,' the University Village Open Space (an extension of the proposed park) and potentially public art installations will serve as other landmarks within University Village

Exhibit C-10:

University Village Landmarks



UNIVERSITY VILLAGE PLAN KEY

- MAJOR ARCHITECTURAL/LANDSCAPE LANDMARK LOCATION
- MAJOR LANDMARK VIEW CORRIDOR
- CAMPUS APARTMENT HOUSING
- GROUND FLOOR RETAIL & RESIDENTIAL
- CAMPUS BUSINESS PARK
- PARKING STRUCTURE
- SURFACE PARKING

C.3 ARCHITECTURAL DESIGN GUIDELINES

The vision for the residential areas of the University Village is one that emulates some of the qualities found in pleasant lower density residential neighborhoods including sidewalks separated from roadways by a landscaped parkway, front yard landscaping and residential apartments visually 'accessible' from the public realm.

GUIDELINES FOR CAMPUS APARTMENT HOUSING

This section applies to all residential apartments within University Village including the upper residential floors of the

Architectural variety at the project and parcel level is a basic design goal for the University Village. Creating visual interest through architectural variety can be best achieved by using multiple architects for various projects using moderate variation in building materials and colors throughout the Village.

ground floor retail & residential buildings in the Village Center.

Residential buildings should be placed to form usable ground level common open spaces. These spaces may be internal to the residential complex or have a secured opening to the public realm.

Residential Apartment Goals

Residential and retail uses should be oriented to Birchknoll Drive by providing primary building pedestrian access, unit balconies and living room spaces fronting/facing the street. Similarly, entry and unit orientations for the north side of the ground-floor-retail-residential-parking development closest to New Roadway North should also face the street. To reduce the visual impact of multi-floor buildings, architectural plan layout and façade design approaches should be used. Buildings grouped around ground-level open spaces that connect with the sidewalk/street; building façades expressing individual unit living spaces through balconies, multi-paned windows, changes in color or materials; and/or providing ground-level private open spaces represent a range of architectural approaches that reinforce the pedestrian scale and experience desired for the residential portions of the University Village.

Architectural Style

- Exterior material and color variations should occur across the University

Common ground level open spaces between adjacent building wings or between projects can become (or at least appear) as a semi-public space emulating the openness of a low-density residential community. Minimum front yard landscape setbacks of 10-feet from the sidewalk are called for along Birchknoll Drive to reinforce the residential character of the neighborhood south of University Village Center.

Village site with at least two developments or major buildings having architecture style, exterior material and color variations different from neighboring buildings. Use of different architects to achieve this goal is encouraged. Highly thematic styles that replicate historic or regional styles such as Cape Cod, Streamline Modern or Mission Revival are discouraged; rather, architectural styles that integrate classical proportions, devices and materials are preferred.

Site Views

- Southern views towards the Port of Los Angeles and southwestern views towards the Palos Verdes Peninsula should be considered when planning the orientation of residential buildings, individual residential units and common upper level or roof top open spaces.

Massing and Creating Usable and Appropriate Open Spaces

- Buildings should be grouped to form usable ground-level open spaces including courtyards, 'U-shaped' and 'L-shaped' yards. 'U-shaped' and 'L-shaped' yards with some open-to-the-sky pedestrian connection to Birchknoll Drive or New Roadway North are encouraged.
- In general, open spaces between building units should be of a width equal to the height of the adjacent building(s).

Open Space

- On each residential development, the majority of units should provide visual access to a ground-level landscaped open space.

Common ground level open spaces should be created to support resident gatherings while providing privacy for adjacent units.

Creation of human-scaled architectural design can be accomplished by defining smaller units of the façade through colors, off-sets in plane, balcony projections, glazed portions, sun shades and a clear definition of the ground or lower floors. The residential nature of this project is further emphasized by the creation of a front yard setback with private open spaces with shrub and small tree plantings.

- All residential units shall provide access to usable, ground-level, open-to-the-sky outdoor common open space.
- Buildings should be grouped to form usable ground-level open spaces including enclosed courtyards, 'U-shaped' and 'L-shaped' yards.
- Development of rooftop common open space is encouraged. Rooftop private open space should be directly accessible to any abutting residential units.
- A common open space buffer shall be created between ground floor residential units directly adjacent to the CSUDH campus and related publicly-oriented walk-ways.
- The site transition between the University Village and the CSUDH campus should be created through grading. Graded and appropriately landscaped slopes are permitted. Retaining wall transitions in these areas are prohibited.

Specific Architectural Guidelines for Apartment Façades

- Buildings should employ the classic expression of base, middle and top levels achieved through the use of building forms, detailing, color and materials.
- Lower-level apartments facing public streets and common pathways should exhibit a richness of architectural detailing, such as raised planters, low walls, entry enriched materials and forms, decorative railings, decorative accent lighting and contrasting complementary colors.
- Ground-level unit entries oriented to Birchknoll Drive and New Roadway North are encouraged.
- Periodic changes in the façade wall plane shall be provided to visually reduce the building mass. A minimal 2-foot vertical off-set of the building plane shall occur every 100-feet of façade length.
- Periodic changes in façade materials colors and/or architectural elements should be used to visually reduce the building mass.
- Windows should be used to reinforce the residential nature of projects within the University Village. Generally façade window openings should contain multiple

A common way of reducing the visual mass of multi-floor residential façades is through the creation of breaks in the façade plane. For residential buildings at University Village a minimum 2-foot offset in the façade plane is required to occur at least every 100 feet of façade frontage.

Color can be a simple yet effective way of reducing the visual mass of a building façade. Façade shadows formed by sills, cornices and building openings create additional subtle colors as well as further defining the multiple façade elements like windows and balconies that visually divide the façade mass.

panes which divide the window into smaller units, evoking traditional residential structures. Alternatively, larger pane glass units can be effectively used on balconies and recessed situations where a more modern California indoor-outdoor design concept is pursued by the architect. Larger panes can also be effectively used to maximize upper story site views to the south and southwest.

Specific Architectural Guidelines for Apartment Colors and Materials

- Contrasting and complementary colors should be used to visually reduce the building mass and provide visual interest throughout the University Village.

Color and material changes as well as breaks in the roof line can be effectively used to reduce the visual impact of large building façades.

Site grading may present conditions where stairs could be used to access individual or grouped ground floor unit entries from adjacent public or private walkways. Such entries can be visually differentiated from the building façade through entry roof projections, enhanced materials, entry planters, decorative lighting or other architectural features.

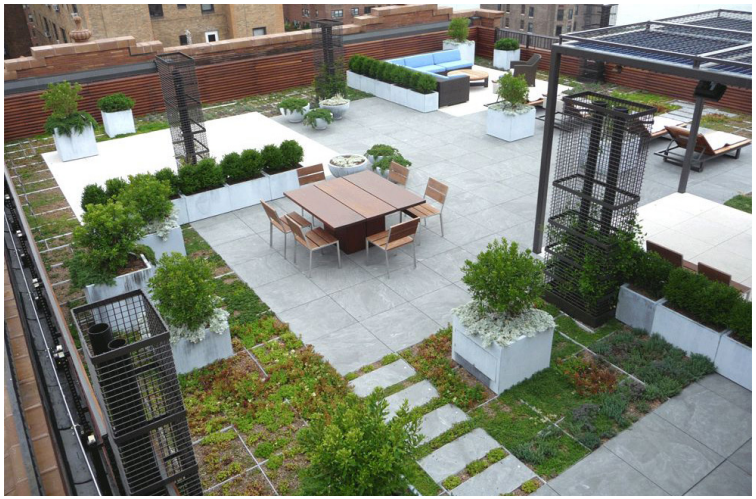
- Division of the façade into horizontal bands that differentiate the building floors while at the same time lightening the appearance of upper floors, can be used to reduce the scale of a large façade. In such situations upper floors can take on a lighter color and/or express a less rough or articulated surface texture. These techniques also work to visually place the upper building floors upon a heavier 'base' level of the building.

Rooftops

- All roof-mounted HVAC and electronic communications equipment shall be completely surrounded by screen-walls visually compatible with the materials and colors of the parent structure.
- Solar PV and solar domestic water systems are encouraged.
- Development of rooftops for common and/or private open spaces is encouraged. In such cases a portion of the rooftop must be provided with landscaping and other amenities such as seating, enriched deck areas, passive recreation areas, shade structures or swimming pools.
- Shock mounting of mechanical equipment: All permanent mechanical equipment such as motors and compressors located on the roofs over residential units which cause structural vibration or structure-borne noise shall be shock mounted with inertia blocks or bases and/or vibration isolators or other suitable means.
- Residential projects should provide pleasant roofscapes as viewed from taller

Artist's Rendering looking north over University Village: showing a detail of a conceptual of roof-top recreational amenities.

Wood decking and shrub-level containerized planters can be effectively used to create a residential yard environment on apartment rooftops.



Common rooftop open spaces, like ground level outdoor common areas, can be divided and organized into perimeter planting, group gathering and individual retreat type spaces. Appropriately chosen and maintained shade trees planted in containers are also encouraged.

residential units located at University Village. Usable and landscaped rooftop open spaces, sloping roofs, solar panel racks over surface parking and rooftop 'penthouse courts' are encouraged for projects built below existing or planned residential units.

- Loft spaces and units fronting improved rooftop private and common open spaces are permitted. See also Open Space section.
- Unimproved rooftops or those without resident amenities should be furnished with cool roof materials/coatings.

Parking for Residential Uses

- Ground-level pedestrian access shall be provided between the concealed parking structures and Birchknoll Drive (particularly for the ground-floor-retail-residential-parking development east of Birchknoll Drive).
- In concept all parking structures constructed in University Village will be 'wrapped' and concealed behind building masses. In selected areas near the eastern residential periphery adjacent to and facing the campus business park uses, exposed, 4-5 floor parking garages may occur. In those instances the exposed parking garage façade must be softened with a combination of architectural and landscaping treatment.

Lighting

- All lighting, including rooftop lighting, should be designed so light does not directly fall on neighboring residential living areas and/or adjacent upper-level residential units.

Architectural detailing such as the glass panel treatment shown above can be used to help soften the façade of a parking structure.

Screen panels planted with vines provide visual relief from an otherwise bare concrete cavernous parking structure.

- Low-level accent lighting of building entries, unit entries accessible to adjacent sidewalks, façades, common open spaces and landscaping at the building base can be used to provide a minimal level of light for security while displaying the aesthetically pleasing features of the residential project.

GUIDELINES FOR RETAIL & RESIDENTIAL BUILDINGS

Ground Floor Retail Façades, Entries and Signage

- The ground-floor-retail-residential-parking projects developed south of Victoria Street shall be separated by an 18-foot sidewalk from Birchknoll Drive. The sidewalk area is intended to support pedestrian activity, outdoor dining and public bench seating. The sidewalk area shall incorporate features such as enhanced paving consisting of decorative concrete treatments or masonry units.
- The retail spaces constructed on the ground-floor-retail-residential-parking projects should front onto Birchknoll Drive sidewalks. As shown on the University Village Illustrative Plan (Exhibit C-2), the retail frontage is intended to 'turn-the-corner'

Ground floor retail & residential buildings will define the University Village Center. Small neighborhood-oriented restaurants, shops and wider sidewalks at the ground level will accommodate pedestrians arriving by foot from the campus and University Village residences as well as from other nearby City of Carson neighborhoods. Balconies and other living spaces should be expressed on the residential levels to create an engaging outdoor atmosphere.

Artist's Rendering of University Village ground-floor-retail & residential development looking south from Victoria Street.

Pedestrian oriented signs are appropriate for University Village Center. Individual letter signs internally or externally illuminated are appropriate. Glass should predominate on storefronts permitting views into and out from the retail spaces and allowing some illumination of adjacent pedestrian areas at night.

along the building side at the building corner to face onto:

  - Victoria Street and Olive Walk
  - Olive Walk and New Roadway North
  - Olive Walk and Village Green Park. The retail frontage onto Village Green Park should be developed with a minimum 18-foot sidewalk to accommodate potential restaurant uses and to form a pedestrian transition into the park.

- Retail entries may also front onto Olive Walk or any east-west pedestrian walkway provided that the walkway be improved to a minimum of 20-feet in width to accommodate pedestrian activity.
- Walkways and any pedestrian plazas adjacent to retail spaces should include enhanced paving materials such as brick, stone or enriched concrete.
- The ground floor façade should be expressed as distinct from the upper residential floors and should express pedestrian-oriented and scaled-features such as enhanced materials, window articulation, plinths, alcoves, architectural detailing, awnings and large windows that invite views out from and into the retail space.
- Retail signs: a sign plan shall be developed for the entire University Village area. A major University Village identification sign such as the one illustrated in the artist's rendering (shown in Exhibit C-5) to be located at the Victoria/Birchknoll Drive adjacent to University Village Center should acknowledge California State University, Dominguez Hills with such phrases as: 'University Village at CSU Dominguez Hills'. Notwithstanding the sign plan, the following general design directions are intended for retail signs:

  - Signs should be of a pedestrian scale.
  - Primary retail signs should be placed at the front façade of the retail space.
  - Accent illuminated, indirect and back-lit individual letter signs are encouraged. Internally illuminated band and box signs are prohibited.

Lighting

Benches, low planters, bike racks, trash receptacles and pedestrian-oriented low street lamps, pedestal lights and foot lights should be placed in enlarged sidewalk areas of the University Village Center adjacent to retail spaces to support pedestrians as well as those arriving by automobile or bicycle.

Enhanced materials consisting of concrete treatments and masonry units should be used in sidewalk areas and where appropriate on low façade elements, planters, roadway islands and crosswalk areas of University Village Center.

- Retail façades and areas should be illuminated for evening and nighttime use. Interior light coming through store widows, façade washed accent lighting, down-lights, low pedestrian pole lamps, pedestal lights and foot lights can contribute to a creating a safe and enjoyable evening atmosphere supporting evening use of restaurants and retail uses.
- Lighting should be designed so as to not directly fall on neighboring residential living areas and/or adjacent upper level residential units.

RESIDENTIAL APARTMENTS: SPECIAL ARCHITECTURAL CONDITIONS

Treatment of Exposed Parking Structure Façades

- East-facing façades of parking structures developed may be exposed along the service roads separating these structures from the Campus Business Park. In those conditions the parking structures shall receive architectural and landscape treatments designed to limit the visible impact of these structures as viewed from public areas and adjacent projects.
- No vehicle located in these parking structures shall be visible from the ground level adjacent to the parking structures.
- Wall/façade openings, cast panels, cast structural posts and beams, decorative metal screens, glass panels, planters, vine screen/plantings, materials, colors and painted graphic techniques shall be used to visually reduce the scale of the parking structure and to modulate the parking structure façade.
- Parking garage auto access is limited to the abutting service roads.
- A minimum 5-foot wide landscape planting strip shall separate the exposed parking garage from the adjacent service road.

The site conditions for the proposed campus business park buildings along Central Avenue may be similar to in this example. The campus business park buildings may be developed on building pads lower than Central Avenue created through the grading of the campus business park development west of Central Avenue. As illustrated here at the left, double-loaded parking aisles would be parallel to Central Avenue. At the far right, a landscaped buffer of a minimum of 20-feet would be provided between Central Avenue and the parking areas. Also illustrated to the left, a minimum 5-foot wide planting buffer would occur between the parking areas and the building itself. Here accentuated glass at the entry office, enhanced color and entry façade articulation combine to identify the building entry and give interest to the large building mass.

Appropriate trees with a vertical character, bamboo or vines and base shrubs should be used to soften the appearance of the parking structure as viewed from the abutting service road, adjacent to campus business park and Central Avenue. See Section C.4 for guidance on plant selection.

Development of Usable Rooftop Open Space

(See "Guidelines for Residential Apartment Structures/Rooftops" section above).

GUIDELINES FOR CAMPUS BUSINESS PARK STRUCTURES

Building Orientation and Definition

- Primary building entries should face Central Avenue.
- Main vehicle access driveways into Campus Business Park surface parking areas shall be primarily from Central Avenue.

Outdoor employee break areas are required for all Campus Business Park projects. Movable or permanent seating solutions and shade structures and/or trees are encouraged.

- A minimum 20-foot wide landscape buffer should be provided between the back-of-sidewalk along Central Avenue and parking areas and drives in front of the campus business park structures built west of Central Avenue.
- Building frontages shall be separated from adjacent parking bays and roadways by minimum 10-foot wide landscape areas/strips. The landscape character expressed in these planning areas is described in Landscape Section C-4.
- Building sides shall be separated from adjacent parking bays and roadways by
minimum 5-foot wide landscape areas/strips.

Building Façade Articulation and Details

- Building entries should be the focal point of the front building façade. This can be accomplished through a variety of architectural expressions using façade forms, enhanced materials, textures and/or colors. Entry walkways should be enhanced with features such as planters, entry plazas, pedestrian lighting and concentrated landscape treatments.
- Front end offices and mezzanines can be expressed architecturally along the front façade.
- Periodic changes in the façade wall plane shall be provided to visually reduce the building mass. An 'interruption' of the building plane with an offset, pilaster, material change or other similar architectural technique shall occur a minimum of every 200-feet of façade length.
- Use of highly reflective glass for façade curtain walls and windows is prohibited.

Parking

- Parking lots shall be shaded by trees or solar shading devices (See Landscape Section C-4).
- Lighting levels for safety and security shall meet the standards established by the Illuminating Engineering Society of North America (IESNA) for parking lots.

A variety of building sizes may ultimately be constructed in the campus business park area and individual parcels. Buildings constructed on Parcels 6B will have sides oriented to New Roadway South and Parcel 7A would front onto New Roadway South. In such varied conditions, campus business park façades can be divided into smaller unites to reflect different ultimate tenant demands and to articulate the façade in a more interior portion of the University Village transitioning to the residential neighborhood and CSU Dominguez Hills campus.

Typical 'tilt-up' construction and building type that could be built at University Village along Central Avenue. Note the enhanced features signaling the building entry: Use of glass, concrete screen/arcade and enlarged paved entry with bollard lighting.

- Outdoor lighting fixtures shall minimize light trespass onto adjacent residential properties.
- Bicycle storage and changing rooms should be provided for employees.

Loading and Service Areas

- All loading and service areas should take their primary orientation to the proposed service road parallel and in between the Campus Business Park development and the ground-floor-retail-residential and parking development.
- Service areas are prohibited along Central Avenue or any frontage driveways parallel and adjacent to Central Avenue.
- Major ground-mounted utility, specialized equipment, HVAC, emergency generator and storage tank infrastructure shall be contained within walled enclosures made of materials visually compatible with the parent building screened from public view.
- Operational yards and mechanical equipment should be shielded from adjacent residential uses to minimize noise impacts.

Rooftops

- All roof-mounted HVAC and electronic communications equipment shall be completely surrounded by screen-walls or structures visually compatible with the materials and colors of the parent structure.
- Solar PV, solar domestic water heating and solar process heating systems are encouraged.
- All rooftops should be finished with cool roof materials/coatings.

C.4 LANDSCAPE ARCHITECTURAL DESIGN GUIDELINES

INTRODUCTION AND GOALS

The landscape 'image' that will be created for the University Village will accomplish two overriding goals: it will establish the University Village as a new unique place in the City of Carson; and, by incorporating trees and other plants common to CSUDH, it will visually connect the new neighborhood to the CSUDH campus. The Landscape Guidelines address a number of conditions that will be created within the University Village by virtue of the type and location of the land uses and projects proposed. In the proposed Village Center area the landscape will work to enhance the pedestrian and retail nature of the area. In the residential areas proposed for south of New Roadway North, implementation of the Landscape Guidelines will help create an area that has residential characteristics that recall and are reflective of a smaller scale traditional single-family neighborhood. Landscape guidelines for the proposed Campus Business Park are intended to present a modern business-oriented environment as viewed form Central Avenue and to visually modulate the presence of potentially long building façades and surface parking areas. Finally, guidelines are provided for the proposed Village Green Park and the adjacent open space area which will become central neighborhood-defining features of the University Village.

Major Goals

- Create a functional and beautiful landscape that supports the Cal State Dominguez Hills public-private partnerships;
- Create a sustainable landscape system that weaves the University Village and CSUDH Campus Core together;
- Encourage biodiversity through planting;
- Develop a visual identity and improve wayfinding;
- Improve connectivity of circulation modes, including pedestrian, bicycle, auto and transit; and
- Create a University Village project that supports and complements CSUDH academic and community programming.

The University Village landscape guidelines included in this section are organized into six basic categories to help future developers understand which guidelines apply to each area and land use within the University Village.

Entry Points refer to the landscape and right-of-way areas immediately surrounding the vehicular entrances into the University Village from the surrounding streets: Victoria Street on the north and Central Avenue on the east.

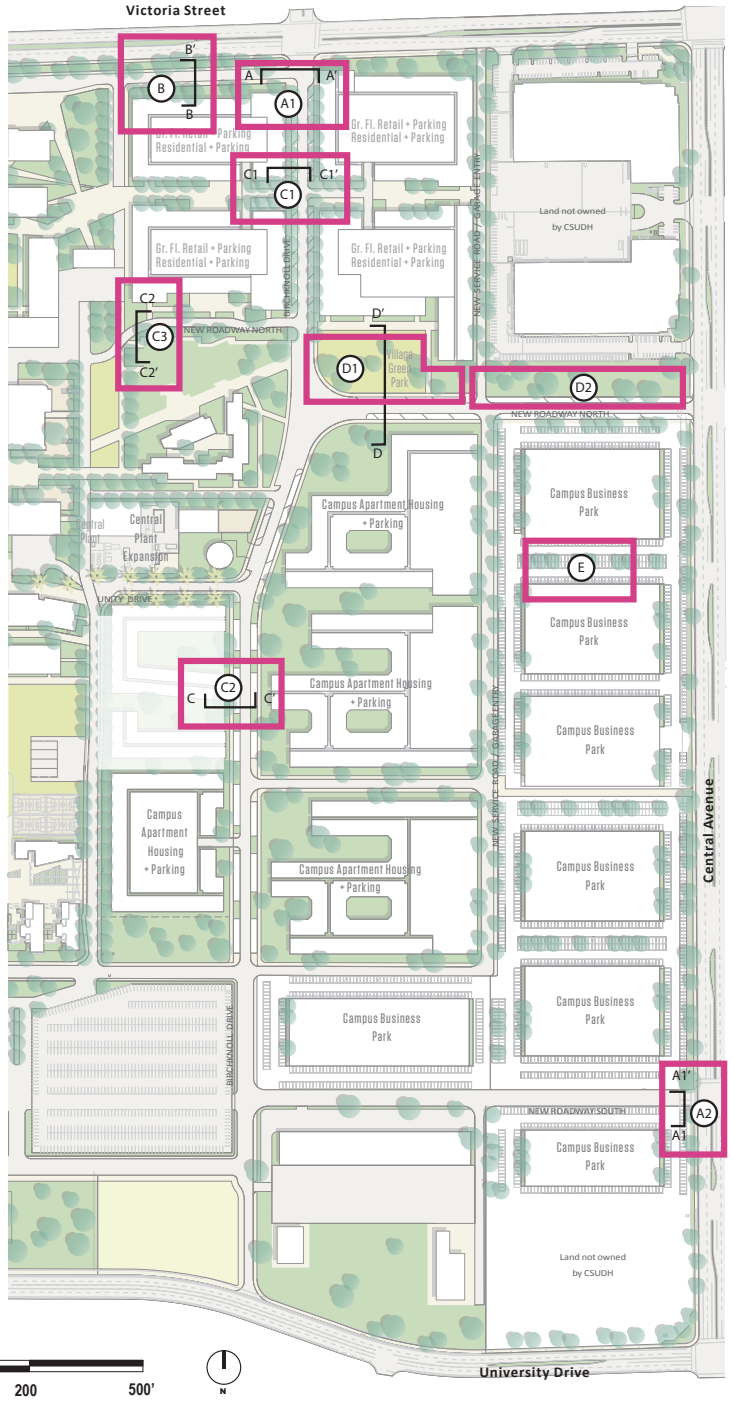
External Roadway Corridors refer to the landscape areas adjacent to Victoria Street and Central Avenue.

Internal Roadway Corridors refer to the landscape areas adjacent to and overall cross-sections of the streets that provide vehicular access to the interior of the University Village.

Special Facilities category describes concept design for the Village Green Park and University Village Open Space.

Exhibit C-11:

University Village Landscape Guidelines: Scope and Context



LEGEND

UNIVERSITY VILLAGE ENTRY POINTS:

- (A1) BIRCHKNOLL RD/VICTORIA ST.
- (A2) NEW ROADWAY SOUTH / CENTRAL AVE.

EXTERNAL ROADWAY CORRIDORS:

- (B) EXTERNAL ROADWAY CORRIDORS VICTORIA ST.

INTERNAL ROADWAY CORRIDORS:

- (C1) BIRCHKNOLL RD (RETAIL SEGMENT)
- (C2) BIRCHKNOLL RD (RESIDENTIAL SEGMENT)
- (C3) NEW ROADWAY NORTH

SPECIAL FACILITIES DESIGN CONCEPTS :

- (D1) VILLAGE GREEN PARK
- (D2) "UNIVERSITY VILLAGE OPEN SPACE"

SPECIAL CONDITIONS LANDSCAPE CONCEPTS:

- (E) CAMPUS BUSINESS PARK SURFACE PARKING AREAS (TYPICAL)

Special Landscape Conditions include guidelines for bioswales, screening of service areas, screening of ground-mounted utility infrastructure, and landscape irrigation systems. Several example designs are included in this document which demonstrate conceptual ways to implement the guidelines. The locations of these example designs (plan view vignettes and cross-section diagrams) are shown in Exhibit C-11.

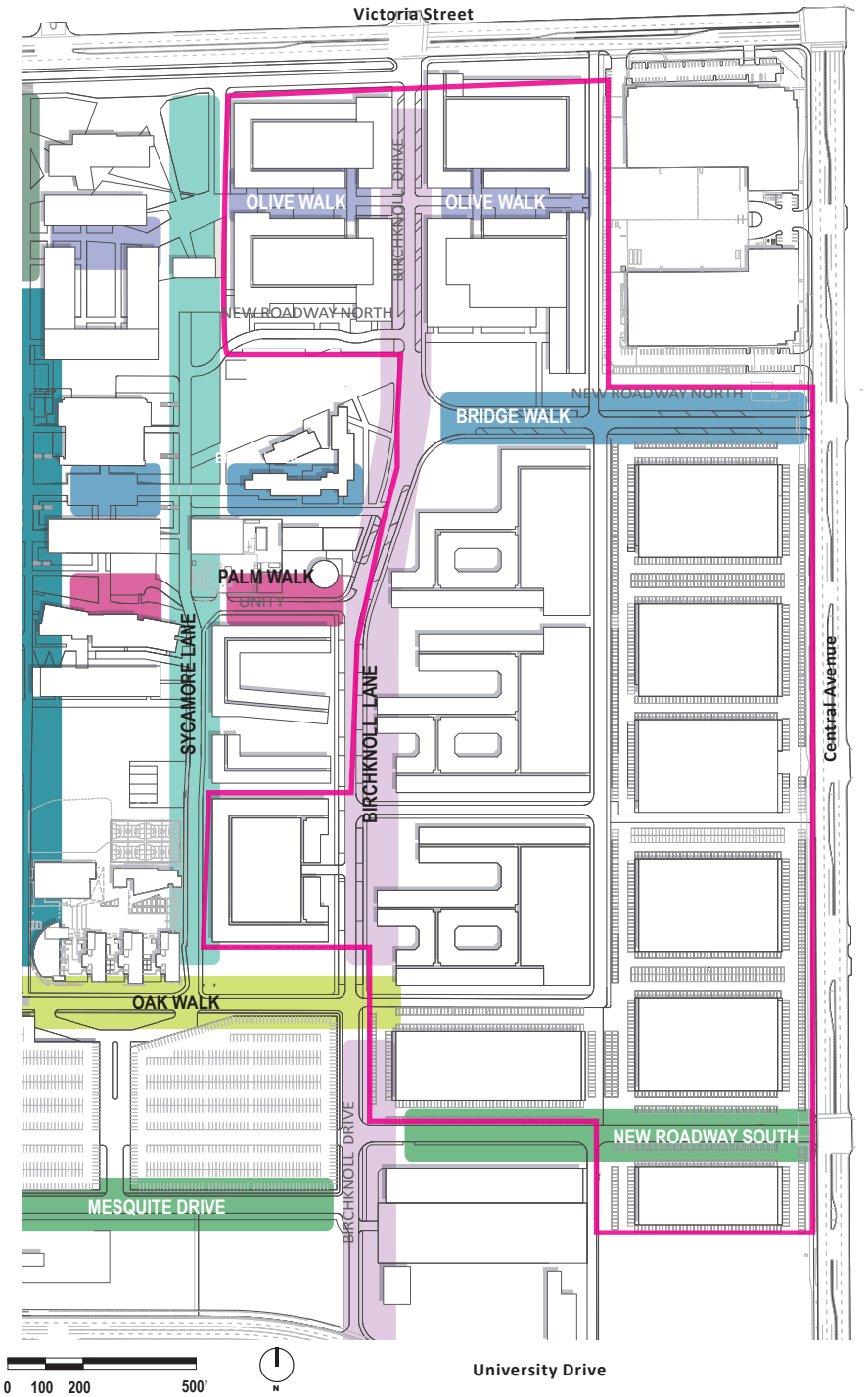
Landscape Interface with Buildings and Architecture includes guidelines for landscapes visible from streets and modulation of building façades using landscape materials.

Pedestrian Corridors

One of the goals of these Design Guidelines is to create a Pedestrian Corridors landscape system that weaves the University Village and CSUDH Campus Core together. The Guidelines for the 2018 Master Plan provides for a network of pedestrian corridors for the Campus Core with guidelines for improving wayfinding and campus identity through the use of tree species, hardscape, and other design motifs. For planning purposes, these corridors are being referred to by the botanical names of the trees that are recommended as components of the pathways' landscape plans. Exhibit C-12 illustrates how these pedestrian corridors should be extended into and through the University Village. Olive Walk, Bridge Walk, Mesquite Drive, and Birch Knoll Lane span both the campus core and the University Village. As the design of project's buildings and pedestrian routes become solidified in later phases of the project, connection to core campus corridors such as Palm Walk and Oak Walk should be created as appropriate. Guidelines for the relevant corridors are included in this section.

Exhibit C-12:

University village: Pedestrian Corridors

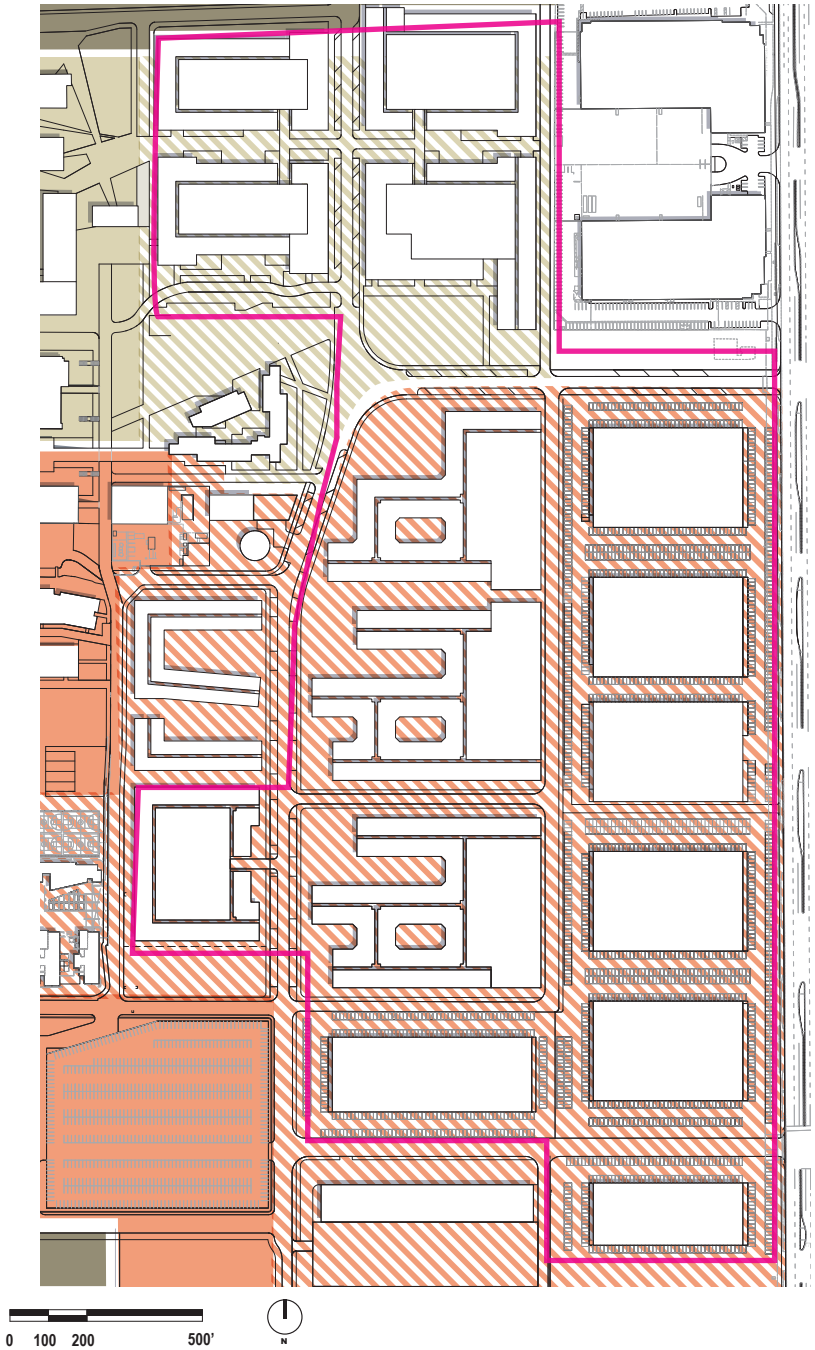


Landscape Zones

The Guidelines for the 2018 Master Plan outlines four distinct landscape zones for the CSUDH Campus Core that are largely characterized by plant species from global regions with a Mediterranean type climate; the California and Mediterranean Basin as two of these along with the Campus Edge zone, extend into the University Village site (Exhibit C-13). Plants from Mediterranean climates tend to grow well in Southern California and an extensive palette of plant materials are part of the Master Plan's goal of supporting bio-diversity on campus lands. The University Village Mediterranean Basin Zone encompasses the Village Center and the Village Green Park; the California Zone applies to the residential apartment sectors and campus business park as well as the University Village Open Space. The Campus Edge forms the buffer between external streets and the University Village. The Campus Edge Zone uses plant materials that originate from Mediterranean climate zones, but are selected for color and compatibility rather than strictly species origin. The Campus Edge Zone also creates a color palette built on CSU Dominguez Hills' school colors of burgundy and gold, and is meant to create a sense of identity and a sense of arrival for the campus and, by extension, University Village. Guidelines for selecting plant material based on the Landscape Zones are included in this section.

Exhibit C-13:

University Village: Landscape Zones



UNIVERSITY VILLAGE ENTRY POINTS

University Village Center Entry

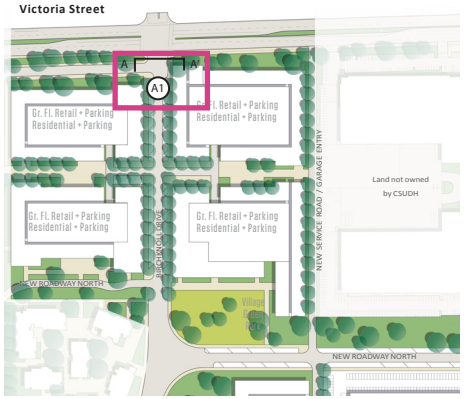
- Birchknoll Road Entry from Victoria Street
- New Roadway North Entry from Central Avenue

Character:

This entry typology serves visitors to the University Village Center retail area, residential areas, and Village Green Park space. These entry points shall take advantage of monument signage, planting and view corridors to create a welcoming sense of arrival at a destination. Tree and shrub planting should not obstruct views to monument signage nor tenant signage. Plant material shall be selected that leaves clear views above 2'-0" and below 6'-0" to maximize visibility of pedestrians, bicyclists, and vehicles at these busy intersections.

Trees/Planting:

- Street trees along Birchknoll shall be European White Birch. Reference Landscape Zones (Exhibit C-13), Pedestrian Corridors (Exhibit C-12) and the University Village Plant Palette (Exhibit C-24) for other applicable species.
- Formal tree planting should frame the entry view, while not blocking view corridors. Use white-flowering crepe myrtle trees for framing entry.
- Trees in hardscape areas shall be installed in 5' diameter steel tree grates. Model: Urban Accessories - Flat Rainbow

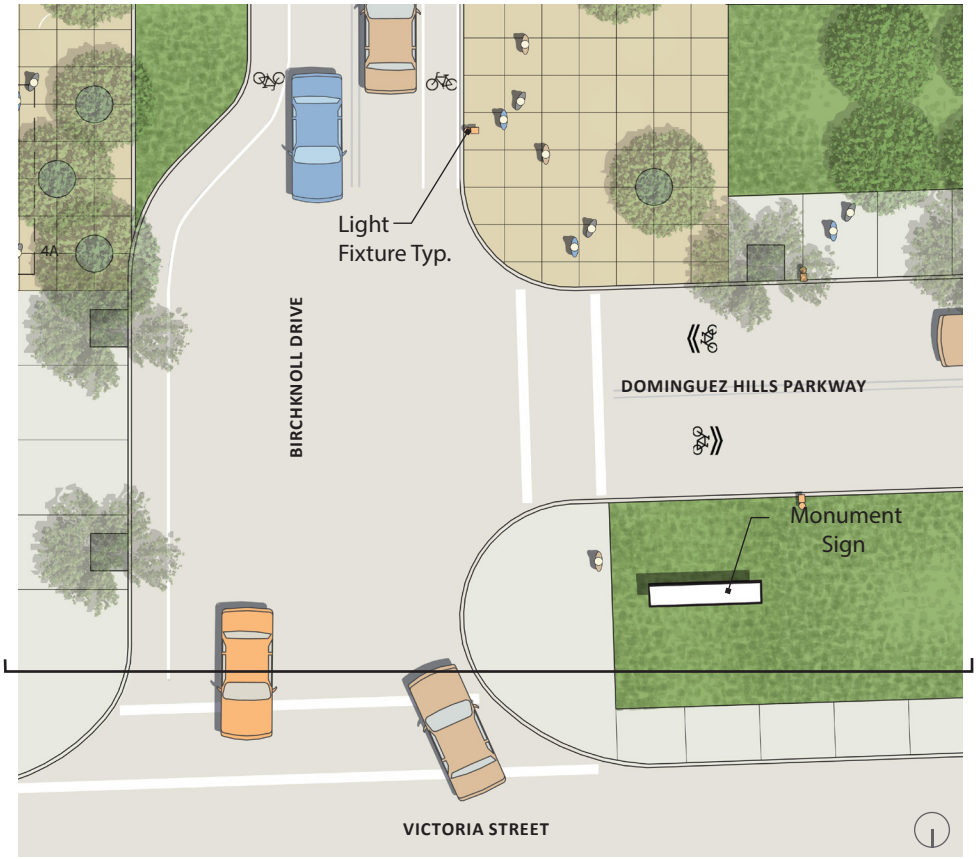


Materials:

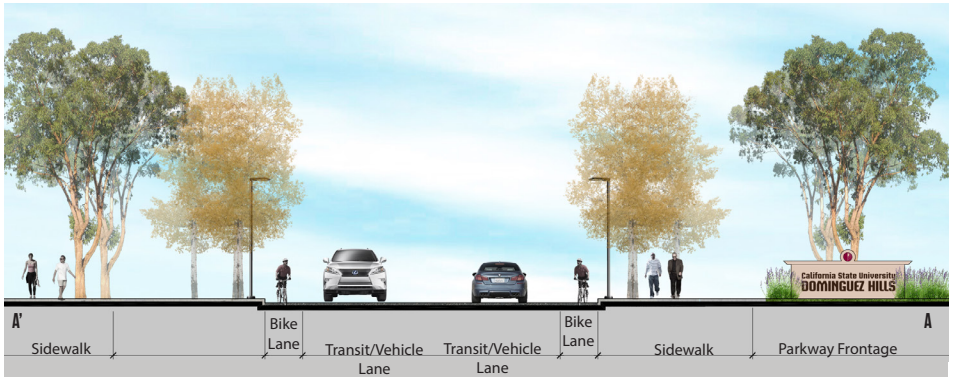
- Existing sidewalks along Victoria St and Central Ave shall remain.
- New pedestrian walkways shall be natural colored concrete with a Top-Cast 05 (or equal) finish unless otherwise specified in the Pedestrian Corridors Guidelines
- Recommended pedestrian pathway width is 8'-0"
- Monument signage is recommended as a low blade wall to the right of the Birchknoll entrance parallel to Victoria St. Letters should be big enough to be read from across Victoria St. A complementary blade wall is recommended across the entry drive from the signage. Signage should be designed by a signage consultant within the context of a signage master plan for the campus and University Village.

Exhibit C-14:

Birchknoll Drive Entry from Victoria Street (A1)



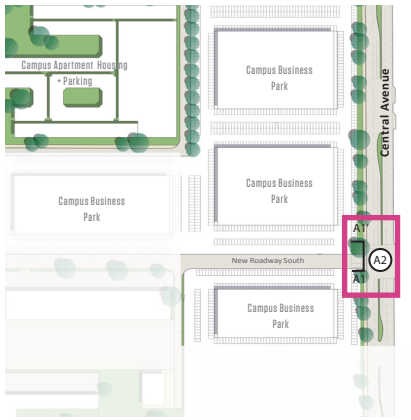
Plan View



Cross Section at Birchknoll Drive and Dominguez Hills Parkway

Secondary Village Entry

- New Roadway South from Central Avenue



Character:

This entry primarily serves Village residents and patrons of Village retail venues. Signage should be less monumental than for used at the Birchknoll/Victoria entrance (A1). A freestanding signage pillar is recommended to be installed on the right side of the entry. Signage should be designed by a signage consultant within the context of a signage master plan for the campus and University Village.

Trees/Planting:

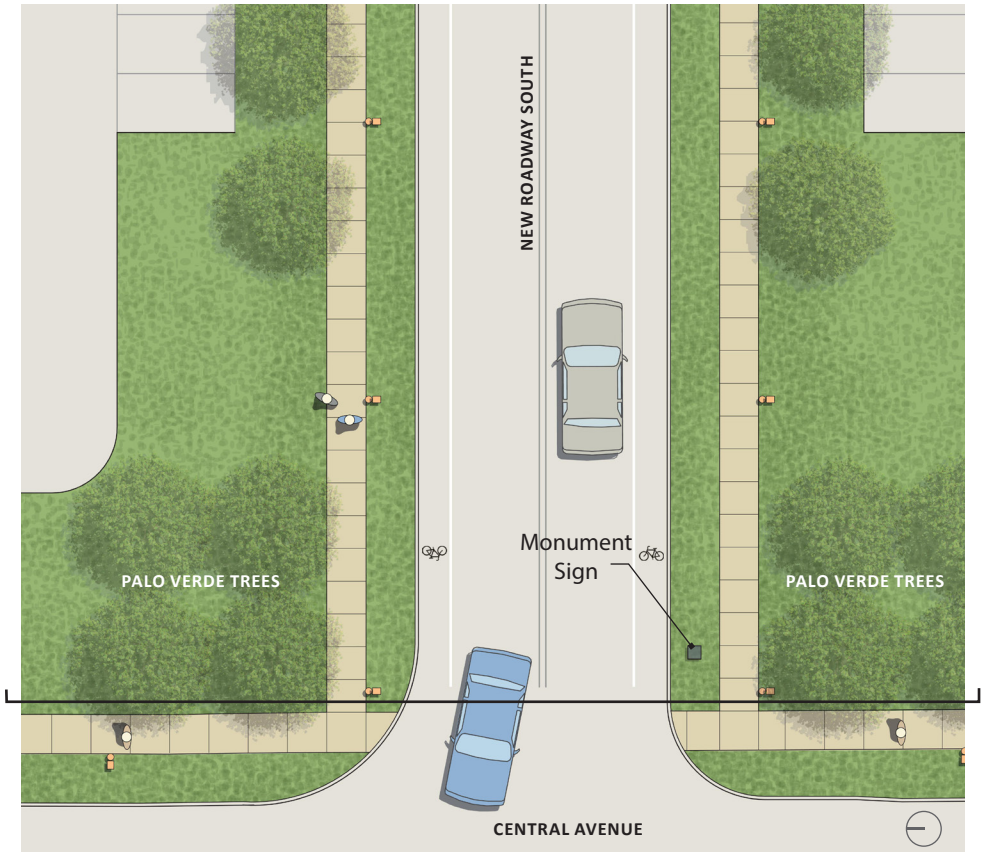
- Street trees along New Roadway South should conform to the recommendation for Mesquite Drive (e.g. Chilean Mesquite and Palo Verde trees). Reference Landscape Zones (Exhibit C-13), Pedestrian Corridors (Exhibit C-12) and the University Village Plant Palette (Exhibit C-24) for other applicable species.
- At each corner of the entry, a formal grid of four Palo Verde trees should be installed (*Parkinsonia x 'Desert Museum'*). These trees should be installed at no less than 48" box size.

Materials:

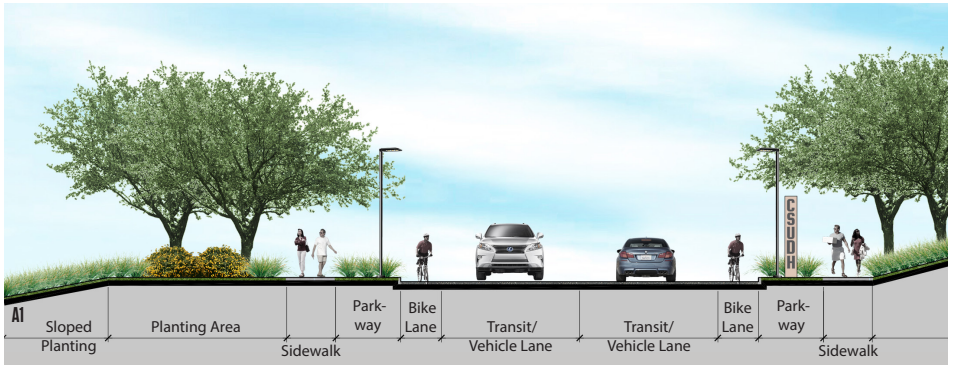
- Existing sidewalks along University Drive and Central Ave shall remain.
- New pedestrian walkways shall be natural colored concrete with a Top-Cast 05 (or equal) finish unless otherwise specified in the Pedestrian Corridors Guidelines.
- Recommended pedestrian pathway width is 8'-0."
- Monument signage is recommended as a free-standing pillar with lettering visible from across the street.

Exhibit C-15:

New Roadway South Entry from Central Avenue (A2)



Plan View



Cross Section at New Roadway South and Central Avenue

EXTERNAL ROADWAY CORRIDORS

External Roadways

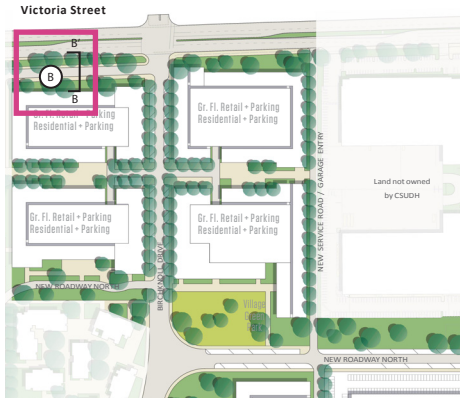
- Victoria Street and Dominguez Hills Parkway Frontage Road
- Central Avenue entries

Character:

External roadway corridors should preserve and enhance the existing landscape by retaining existing *Eucalyptus citriodora* and underplanting with plant material from the Campus Edge Landscape Zone. While some uses around the periphery of campus are not related to the function of the University, the intent is to blend the landscape character of the University Village into the fabric of campus, starting with the streetscape around the perimeter. The use of maroon and gold plant materials and signage is recommended to provide a sense of identity for the campus and the University Village.

Trees/Planting:

- Reference Landscape Zones (Exhibit C-13), Pedestrian Corridors (Exhibit C-12) and the University Village Plant Palette (Exhibit C-24) for applicable species.
- Preserve existing *Eucalyptus citriodora* unless otherwise directed by a certified arborist.
- Where a planting buffer of 20'-0" or more exists between the back of sidewalk and other uses, plant a mixture of *E. citriodora* and other tree species



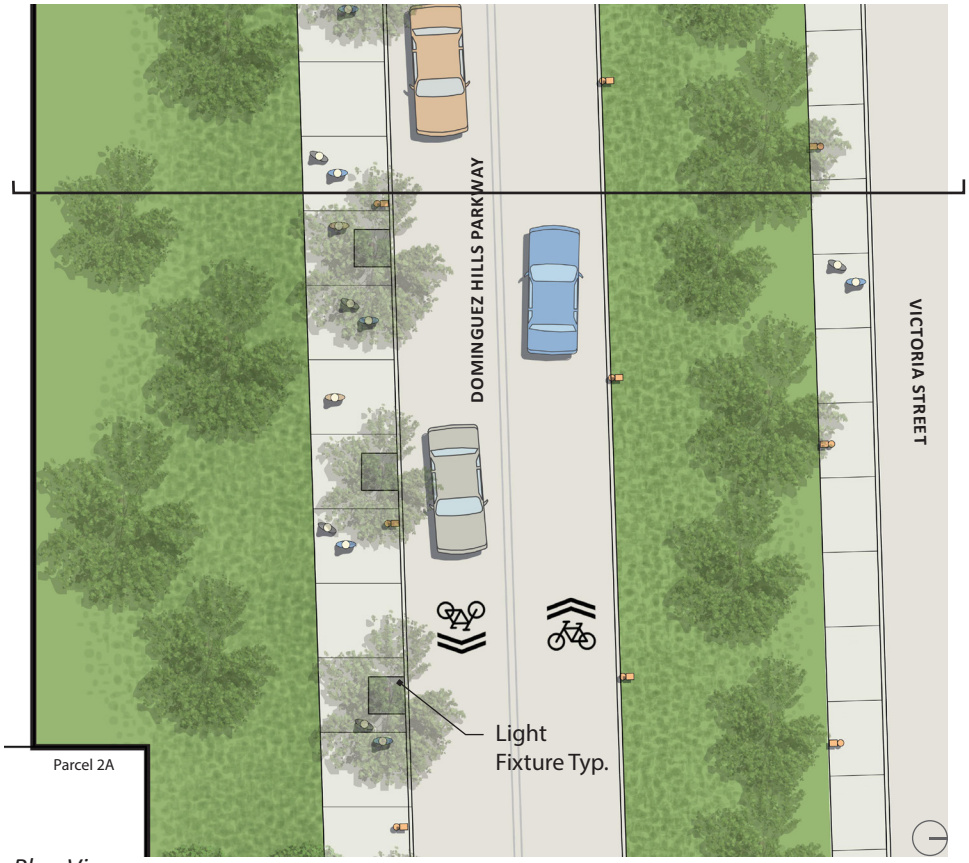
from the Campus Edge Landscape Zone.
- Planting along Dominguez Hills Parkway -- new street trees should be selected from the Campus Edge Landscape Zone and be installed in the sidewalk in 60" tree grates.
- Shrub and groundcover planting should not exceed 3'-0" high to allow for sightlines into campus and to tenant signage.

Materials:

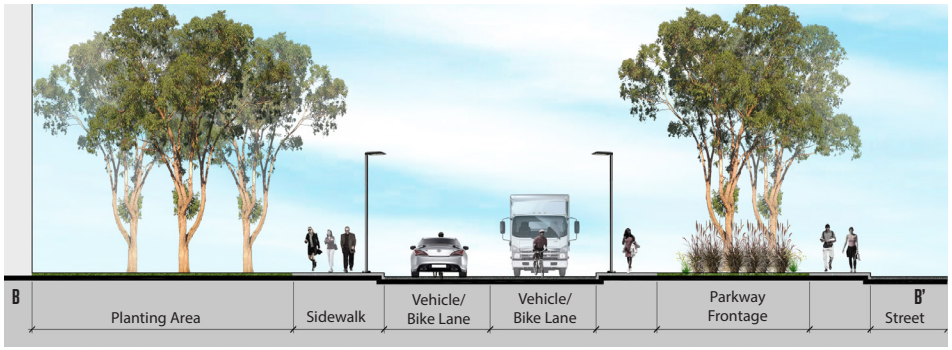
- Existing sidewalks shall remain.
- New sidewalks should be natural colored concrete with a Top-Cast 05 (or equal) finish.
- It is recommended that benches be installed along the sidewalk on Dominguez Hills Parkway every 100'-0" on average.
- Reference Furniture Palette for recommended furnishing models (Exhibit C-22).

Exhibit C-16:

Victoria Street / Dominguez Hills Parkway (B)



Plan View



Cross Section

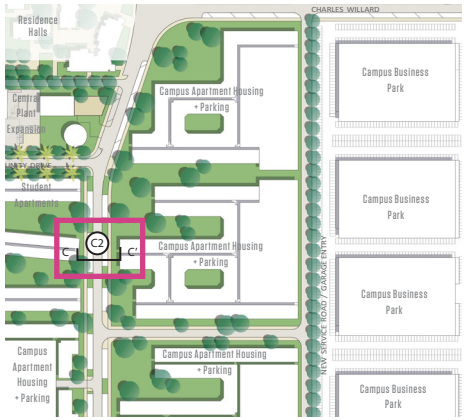
INTERNAL ROADWAY CORRIDORS

Birchknoll Drive Residential Segment

Character:

Birchknoll Drive is the main north-south corridor through the University Village. Through the southern section, Birchknoll Drive passes through student housing on the west and campus apartment housing on the east. The landscape character is intended to be residential in character in comparison to the more intensive retail-residential-parking development at the north end of Birchknoll Drive. Recommended building setbacks should be a minimum of 10’-0” from the back of sidewalk to allow “front yards” between the living spaces and the road.

Angled street parking is back-in oriented to allow for easy parking access and providing a balance between parking quantity and overall road width. Back-in angled parking is preferable to 90-degree parking because of the safety benefits associated with it. The visibility for drivers is better with back-in angled parking compared to front-in angled or front-in 90-degree parking; this is particularly important next to a bicycle lane. Where there is no parking, a wide parkway planting area occupies that portion of the street section. Parallel parking is included on the west side of Birchknoll Drive. It is recommended that no more than three



consecutive parallel parking spots occur without an 8’-0” wide planting buffer. The planting buffer between groups of parallel parking stalls should be no less than 10’-0” in length along the direction of travel.

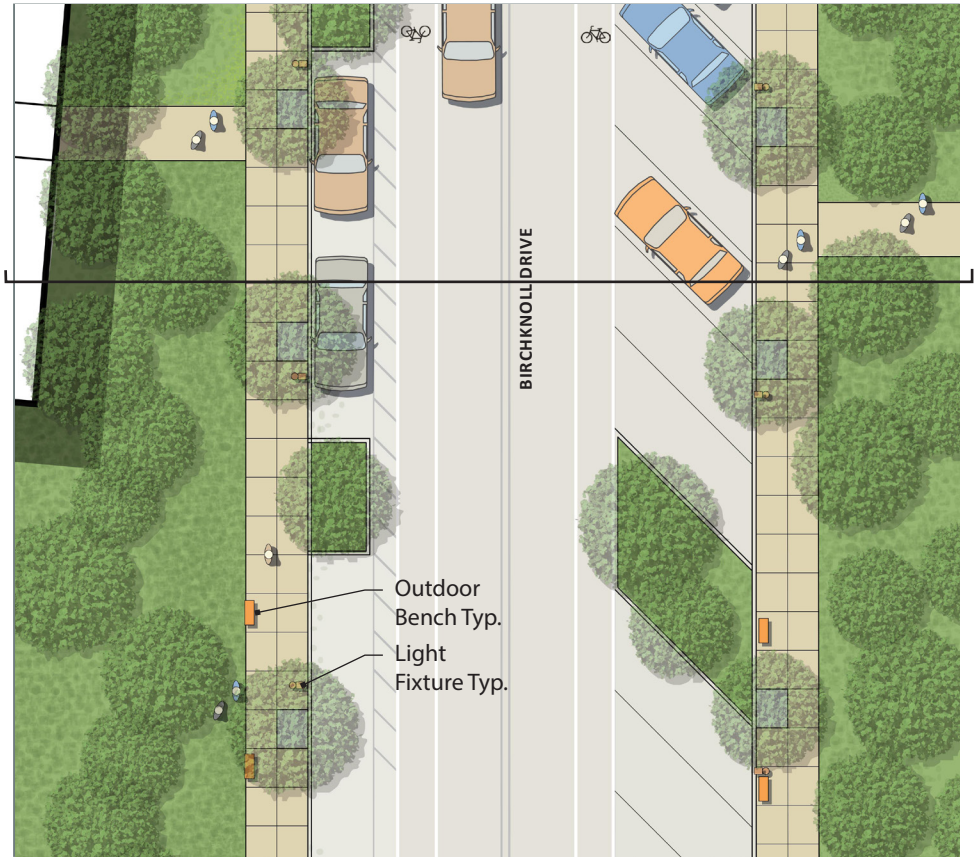
Trees/Planting:

- Reference Landscape Zones (Exhibit C-13), Pedestrian Corridors (Exhibit C-12) and the University Village Plant Palette (Exhibit C-24) for applicable species.
- The signature tree for the Birchknoll corridor is the European White Birch. Street trees should be planted in naturalistic groupings within the parkway.
- Ornamental grasses per the relevant Landscape Zone s hould be installed as underplanting below the birches. On the parcel side of the sidewalk, refer to the Landscape Zones for tree and plant species.

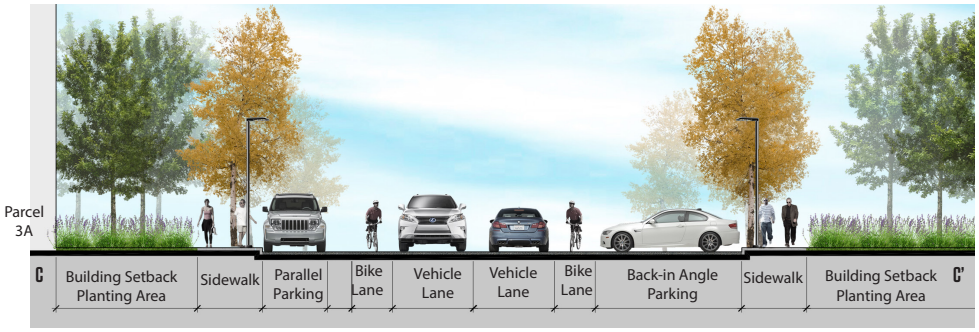
Tree massings shall be located so as not to block sightlines from the street into building entrances, leasing campus business park storefronts, and public courtyards on both sides of the street.

Exhibit C-17:

Birchknoll Drive / Residential Segment (C2)



Plan View



Cross Section

Materials:

- Sidewalks should be natural colored concrete with a Top-Cast 05 (or equal) finish.

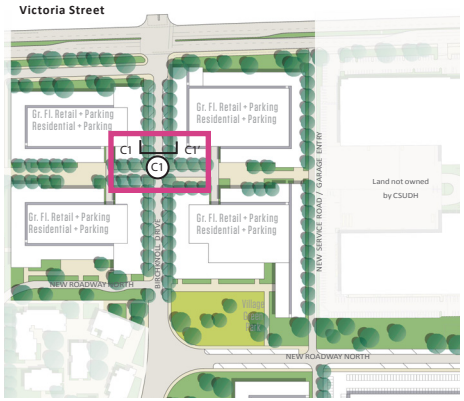
Birchknoll Drive Retail Segment

Character:

The northern section of Birchknoll Drive, between New Roadway North and Victoria Street, will become the center of activity for the University Village. The Birchknoll Drive Retail Segment bisects the new ground-floor-retail-residential development with retail storefronts opening directly to the sidewalk. The landscape character is meant to visually complete the birch-lined Birchknoll corridor by continuing the tree planting theme through the retail segment. The lane widths and parking configuration should be the same as the Birchknoll Drive Residential Segment. The sidewalks along Birchknoll are recommended to be wider than elsewhere, at 18' from back of parking curb to face of building. This extra width allows for outdoor dining and space for tenant signage and displays, while accommodating a healthy tree canopy.

Trees/Planting:

- Reference Landscape Zones (Exhibit C-13), Pedestrian Corridors (Exhibit C-12) and the University Village Plant Palette (Exhibit C-24) for applicable species.
- The signature tree for the Birchknoll

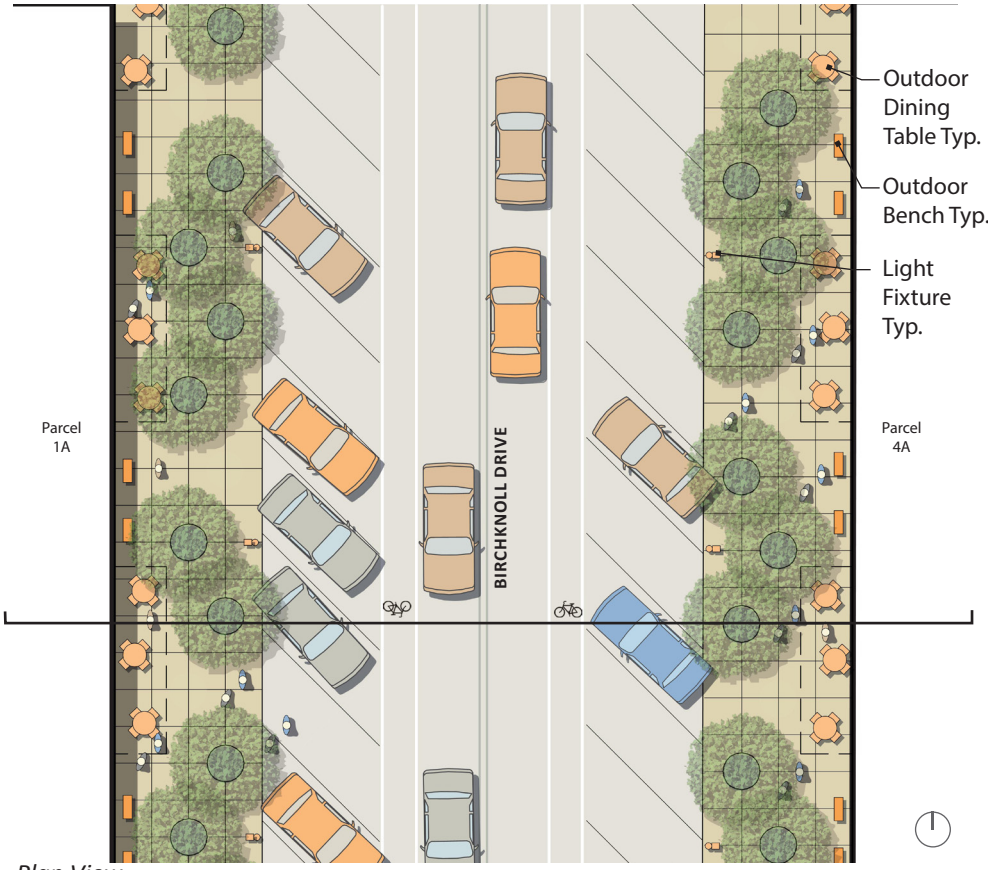


Corridor is the European white birch. Birches should be planted in 5'-0" diameter tree grates arranged asymmetrically in the sidewalk. Tree wells and grates should be centered on the intersection of scorelines in the sidewalk paving and should be installed no less than 10'-0" from the face of the retail storefronts. Trees should be arranged to create open areas for sidewalk dining while also maximizing shade coverage on the sidewalk and parking stalls.

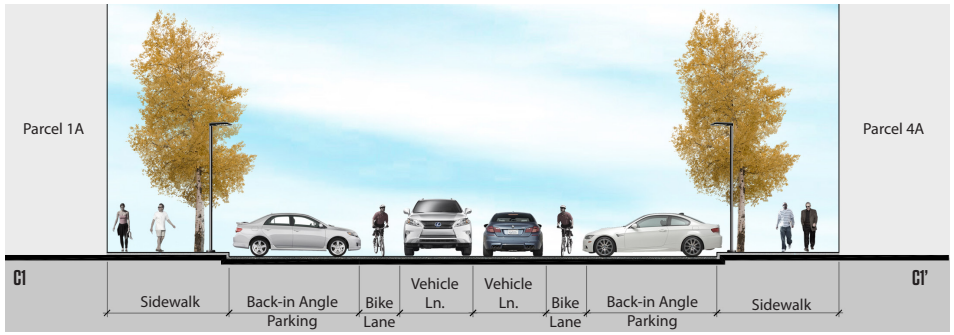
- Ornamental grasses per the relevant Landscape Zone should be installed as under-planting below the birches if they occur in parkway planters or between angled parking spots. On the parcel side of the sidewalk, refer to the Landscape Zones for tree and plant species. Tree massings shall be located so as not to block sightlines from the street into building entrances on both sides of the street.

Exhibit C-18:

Birchknoll Drive / Retail Segment (C1)



Plan View

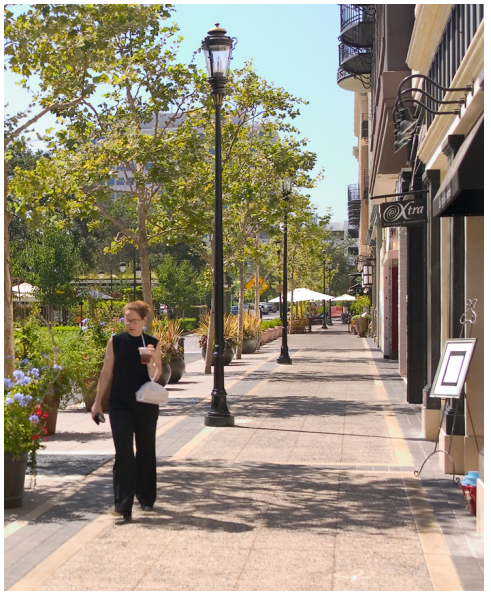


Cross Section

- The Olive Walk corridor (per the 2018 Master Plan) intersects Birchknoll Drive at the center of the ground-floor-retail and residential development. Olive trees along Olive Walk should be planted in 5’-0” square tree wells with decomposed granite surfacing. Refer to Pedestrian Corridors for additional tree and plant species along Olive Walk.

Materials:

- Sidewalks should be natural colored concrete with a Top-Cast 05 (or equal) finish. Scorelines should be arranged on an orthogonal grid with 5’-0” spacing along Birchknoll Drive. Where sidewalks meet the Olive Walk corridor, the scoreline grid should transition to a 2’-6” orthogonal grid.



Service Roads

- New Roadway North
- Unity Drive
- Pacific View Drive
- Parking garage access roads

Character:

Service roads throughout the University Village should be visually and functionally distinct from other roads by having access separated by driveway aprons. Pedestrian pathways should be separated from the service road by a recommended minimum 10'-0" wide planting area. Service roads offset from buildings should be maximized based on the available space.

Trees/Planting:

- Reference Landscape Zones (Exhibit C-13), Pedestrian Corridors (Exhibit C-12) and the University Village Plant Palette (Exhibit C-24) for applicable species.
- Trees should be planted in planting areas and spaced in naturalistic groupings.
- Trees should be located so as to screen views from the service road into private and semi-private living spaces, dining areas, and interior and exterior retail spaces.

Materials:

- Sidewalks should be natural colored concrete with a Top-Cast 05 (or equal) finish.

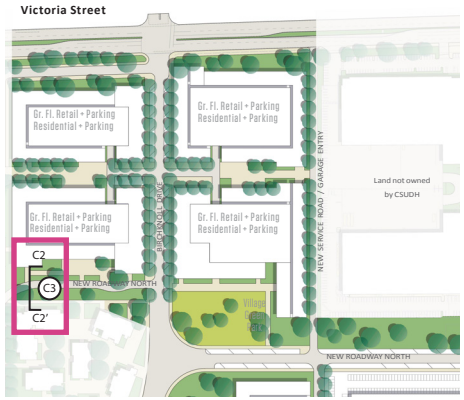
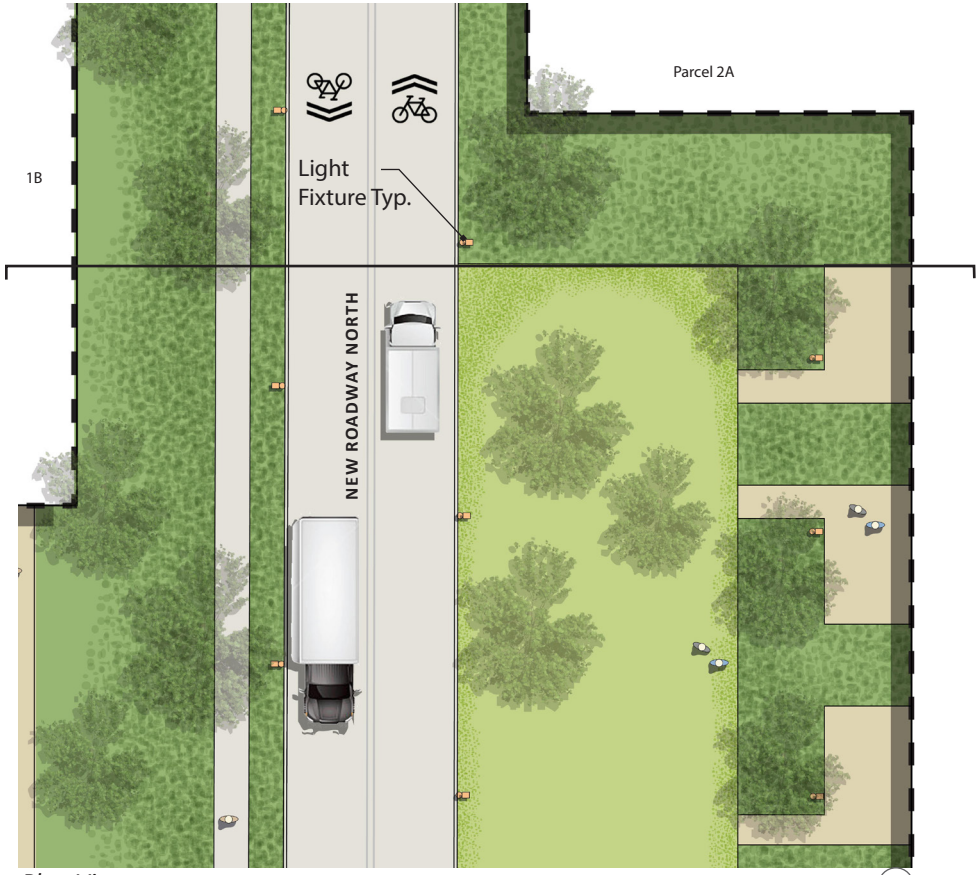
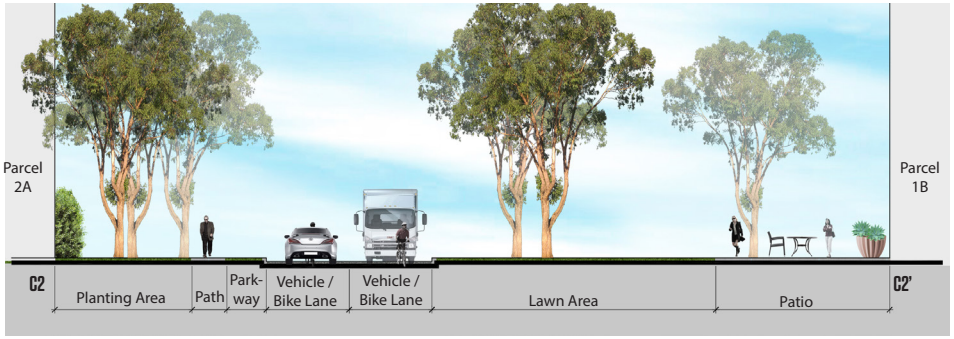


Exhibit C-19:

New Roadway North C3



Plan View



Cross Section

SPECIAL FACILITIES DESIGN CONCEPTS

Village Green Park

Character:

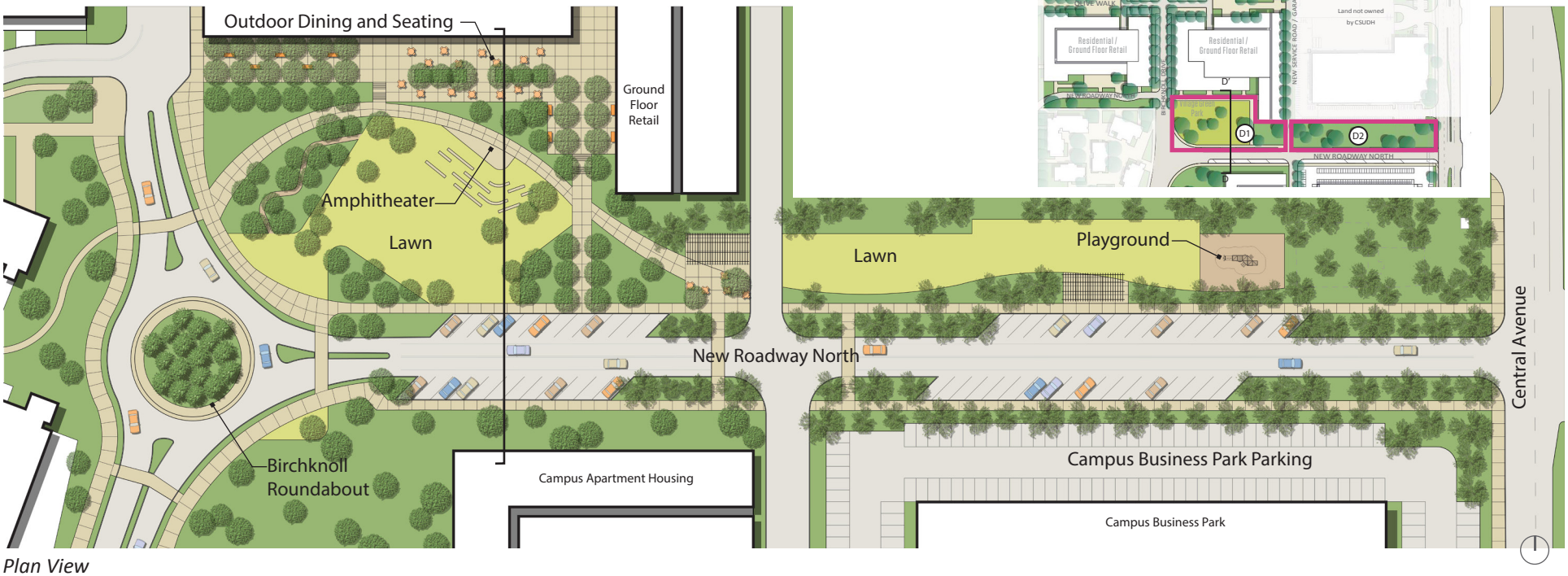
- It is recommended that an approximately 1.1 acre neighborhood public park be developed south of the University Village Center to the northeast of the intersection of Birchknoll Drive and New Roadway North. The park will be separated from the adjacent University Village Open Space (D2) by a new service and parking garage access road along the east sides of the ground-floor-retail-residential-parking development. This park should be heavily planted and provide a natural escape from the more intensively developed parts of the University Village.
- Village Green Park should have the ability to accommodate active programming while functioning for the most part as a passive park space between programmed events. Recommended amenities include a large dining terrace associated with a restaurant venue off of the south side of the ground floor retail north of the Village Green Park; large adjacent hardscape flexible use areas on either end of the terrace to support fairs, markets, etc.; an open-air amphitheater; a large, gently sloped picnic lawn; climate-appropriate planting area; and pedestrian circulation pathways. The existing grades of the University Village to be developed slope down significantly from the northeast to the southwest. Grading will be necessary to create a level pad for the University Village Center, which would likely result in a significant grade change between the dining terrace and New Roadway North. It is recommended that the park design take advantage of this grade change to provide southerly territorial views from the terrace while creating a slope in the lawn that is comfortable for picnicking (5:1 max). An arcing pedestrian pathway is recommended to traverse the lawn and serve as an overlook above the amphitheater stage--curving from the intersection of New Roadway North and Birchknoll Drive up to the dining terrace and back down to the intersection of New Roadway North and the new service road.

Trees/Planting:

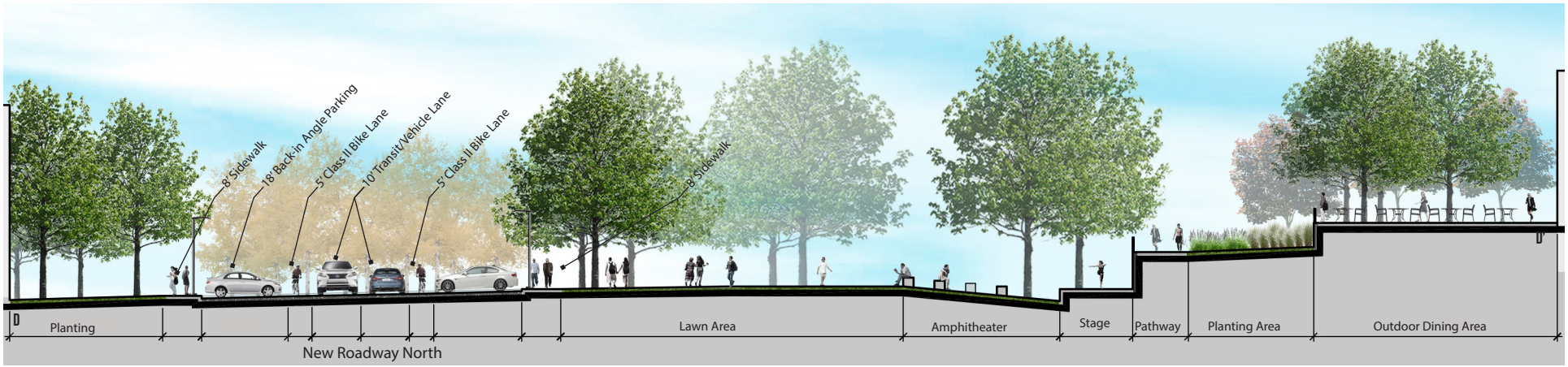
- Reference Landscape Zones (Exhibit C-13), Pedestrian Corridors (Exhibit C-12) and the University Village Plant Palette (Exhibit C-24) for applicable species.
- Village Green Park falls within the Mediterranean Basin Landscape Zone, while the adjacent University Village Open Space is included in the California Landscape Zone. Trees planted within the lawn shall be tolerant of a high water irrigation schedule.

Exhibit C-20:

Village Green Park (D1) / University Village Open Space (D2) / Birchknoll Roundabout



Plan View



Cross Section: Section D-D'

- New Roadway North falls within the Bridge Walk pedestrian corridor. The landscape character of the Bridge Walk is intended to retain much of the existing *Eucalyptus citriodora* canopy through the center of the Campus Core. As a continuation of the historical tree planting scheme, *E. citriodora* should be planted as a street tree along New Roadway North. Due to the large mature size of this species, the eucalyptus should be planted in informal groupings in the parkway planting areas.
- Plant material along pedestrian routes shall be selected that leaves clear views above 2'-0" and below 6'-0" to maximize potential hiding spots.

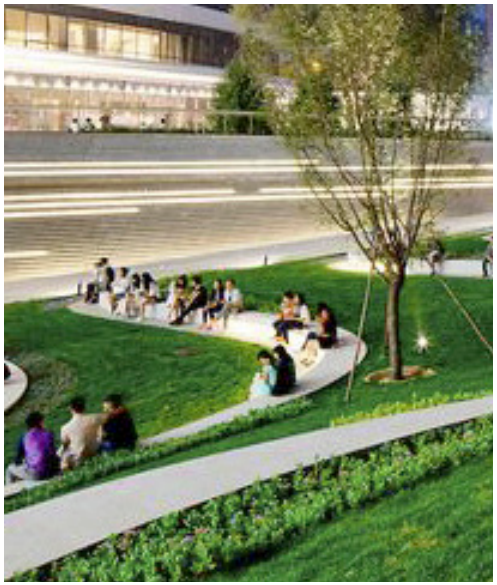
Materials:

- Pedestrian pathways shall be natural colored concrete with a Top-Cast 05 (or equal) finish.
- Scorelines should be spaced at 5'-0" on center.
- The dining terrace and adjacent flexible use hardscape areas should be paved with integral colored concrete with a Top-Cast 05 (or equal) finish. These areas should have an orthogonal grid of scorelines spaced consistently at 2'-6".
- In some hardscape areas, such as outdoor dining, flex spaces, or around the amphitheater, enhanced paving options are encouraged. Enhanced paving should include seeded aggergate natural colored concrete or precast concrete pavers.

University Village Open Space

Character:

- Based upon the University Village Illustrative Plan (Exhibit C-2) a substantial but relatively narrow parcel of campus land totaling about 1.2 acres would be created north of a newly configured New Roadway North extension and west of Central Avenue. As there are various future uses that could be made of this area, it is referred to here generically as the University Village Open Space. Given its location, characteristics and a range of future area needs, the following potential uses are seen as possible:
  - An extension of Village Green Park (preferred option, as illustrated in Exhibit C-20 and described here in the guidelines);
  - An additional open space area to be reserved as a natural reserve similar to the existing Heritage Creek Nature Reserve on the CSUDH campus east of the California Academy of Mathematics and Science (CAMS);
  - Location for future University Village infrastructure such as the planned new electric power substation;
  - A combination of any of the above uses.



- If developed as shown in area D2, the University Village Open Space should have a more passive and flexible program than the Village Green Park. Recommended amenities include a long linear lawn suitable for throwing a frisbee, a dog run, or other informal recreational activities. A hardscape picnic area with an overhead shade trellis is recommended off the sidewalk on the north side of New Roadway North with fixed picnic table seating. A small playground for children ages 2-12 is recommended at the east end of the lawn, in proximity to the picnic area.

Trees/Planting:

- Reference Landscape Zones (Exhibit C-13), Pedestrian Corridors (Exhibit C-12) and the University Village Plant Palette (Exhibit C-24) for applicable species.
- The Open Space falls within the California Landscape Zone. Planting areas should use native Southern California plant species.
- New Roadway North falls with the Bridge Walk pedestrian corridor. The landscape character of the Bridge Walk is intended to retain much of the existing *E. citriodora* canopy through the center of the Campus Core. As a continuation of the historical tree planting scheme, *E. citriodora* should be planted as a street tree along New Roadway North. Do to the large mature size of this species, the eucalyptus should be planted in informal groupings in the parkway planting areas.
- Plant material should be used to screen views from the north side of the Charles Willard Open Space into the adjacent campus business park property.
- Plant material along pedestrian routes shall be selected that leaves clear views above 2’-0” and below 6’-0” to maximize visibility from the pathway and minimize potential hiding spots.

Materials:

- Pedestrian pathways shall be natural colored concrete with a Top-Cast 05 (or equal) finish.
- Scorelines should be spaced at 5’-0” on center.
- The dining terrace and adjacent flexible use hardscape areas should be paved with integral colored concrete with a Top-Cast 05 (or equal) finish. These areas should have an orthogonal grid of scorelines spaced consistently at 2’-6”.

Roundabout

Character:

Based upon the University Village Illustrative Plan (Exhibit C-2), a large intersection occurs at Birchknoll Drive and New Roadway North. Although this type of intersection is possible, subsequent thinking on the part of the planning team suggested that a roundabout for the intersection was a more appropriate alternative and is therefore identified in the University Village Design Guidelines as the ‘preferred alternative’ approach to developing the intersection. Advantages for this type of facility include the following:

- It creates a visual landmark for University Village that could potentially be seen from Victoria Street and the Village Center.
- It can serve as a traffic-calming measure by slowing traffic speed.
- It facilitates traffic flow without stop signs and thus reduces auto emissions somewhat because drivers won’t have to stop, idle and start.
- It is an apt metaphor for “Birchknoll” as it would be planted with European White Birch trees on a slightly raised mount (“knoll”…).
- It reduces noise from cars stopping and accelerating from stop signs.

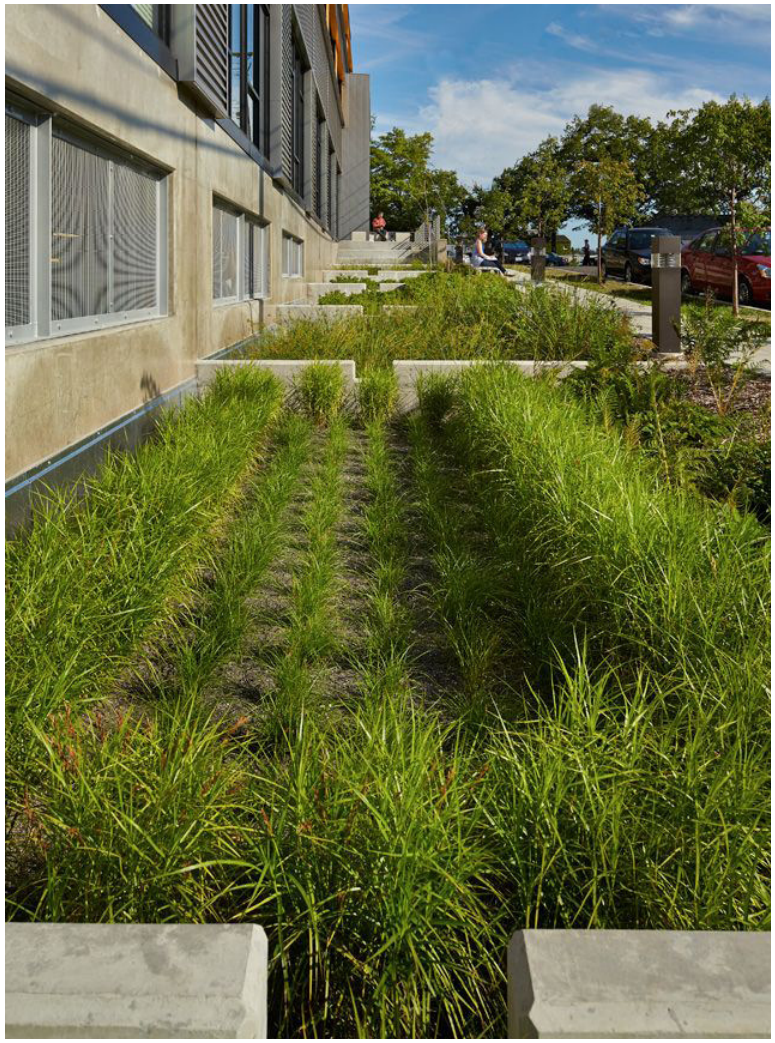
Guidelines for developing the intersection as a roundabout as shown in D1 include:

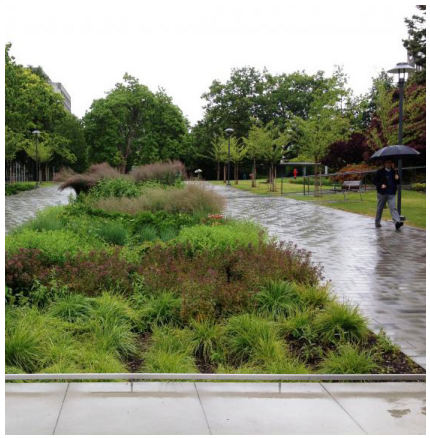
- The roundabout shall be sized by a traffic engineer and designed to accommodate the State of California Legal design vehicle and the Surface Transportation Assistance Act (STAA) design vehicle.
- Public and/or student artwork installations in the center of the roundabout are recommended. This artwork should be fabricated for permanent or rotating outdoor displays.
- The roundabout should function as a University Village Landmark (see Exhibit C-10). A naturalistic grove of European white birch with ornamental grass underplanting (per the Landscape Zones palettes) is recommended within the central circle of the roundabout.

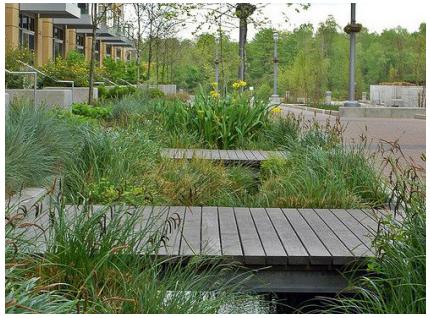
SPECIAL CONDITIONS LANDSCAPE CONCEPTS AND TOPICS

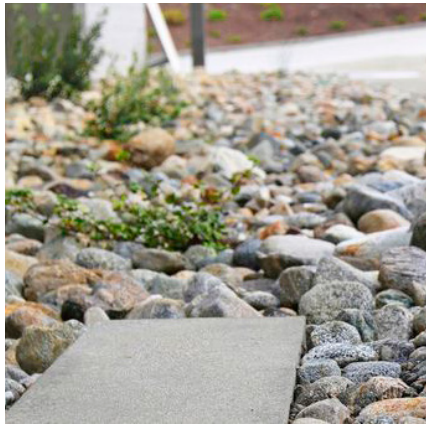
Bioswales

Stormwater runoff in the University Village shall be dealt with in accordance with the latest iteration of the State of California Department of Water Resources Model Water Efficient Landscape Ordinance (MWELO). One of the major tenets of this ordinance is to retain as much of the rainwater that falls on the site as possible (thresholds for this percentage can be found in the ordinance). The preferred method for treating and infiltrating stormwater is through the use of vegetated swales, also known as bioswales. The minimum geometry of bioswales shall be informed by a site specific geotechnical report, and dictated by a licensed civil engineer (See also Appendix B.4). Properly designed and planted bioswales allow stormwater to infiltrate into the native soil, helping to recharge groundwater supplies. In the event that stormwater volumes exceed the capacity of the bioswale system, the water that gets discharged into the external storm drain system has received preliminary filtration, reducing the amount of pollutants that make their way to regional waterways and beaches. Plant materials used in vegetated swales should be able to tolerate infrequent inundation and pollutants.









Screening of Service Areas

Service areas are defined here as outdoor maintenance vehicle parking lots, loading docks, trash enclosures, service yards and other spaces with similar uses. These areas should be screened from view from public pathways and from private residences through the use of plant materials and/or decorative fence enclosures. Where these areas are surrounded by chain link fence, climbing evergreen vines should be planted along the base of the outside of the enclosure. Where there is no chain link fence enclosure, a screening barrier should be constructed from a freestanding "green screen" product with climbing evergreen vines planted at its base. Vines should be selected to account for the specific sun/shade condition. Where the planting area is large enough to accommodate multiple layers of planting, columnar growth-habit trees and foundation planting should be installed between the vines and the curb. Screening with plant materials shall be situated and maintained so as not to block signage and site lighting.

Screening of Ground-Mounted Utility Infrastructure

Landscape areas will become locations for ground-mounted utilities in some cases, such as irrigation reduced-pressure backflow assemblies, irrigation controller enclosures, electrical pedestals, and fiber optic distribution hubs. These utilities shall be sited in locations that comply with state codes dictating clearances and paths of access, as well as in places that take advantage of visual screening provided by buildings, site walls, site grading, and fences. They should be sited to avoid view from public pathways and from private residences. Where permissible, utilities should be enclosed in a lockable decorative architecturally compatible enclosure. In the case of many enclosures, the same screening strategy should be used as for service areas. Where utilities are not located within decorative architectural enclosure, plant materials should be used to provide visual screening, without creating potential hiding spots. In situations where planting or an enclosure does not fully screen the utility equipment from view, a strategy of artistically decorating the equipment should be employed. This can be an opportunity to engage local and/or student artists to paint a mural on the exterior of the equipment or to apply an adhesive vinyl printed graphic. Vinyl graphics can be photographic in nature, functionally camouflaging the equipment through the use of photographs of the surrounding plant material. Photographs used in this situation should be sensitive to the typical natural lighting conditions found at the specific location, and attempt to replicate the typical perceived lighting, color, and scale of surrounding plant material. In such situations color-fast coatings shall be used. Screening materials that are directly applied to the surface of the equipment shall be approved by the applicable regulatory body.

Landscape Irrigation Systems

The CSU Dominguez Hills campus currently uses reclaimed water (delivered from the nearby Joint Water Pollution Control Plant) to irrigate a significant portion of campus landscape areas. This system was last upgraded in 2005. A new meter and mainline should be installed near the intersection of Birchknoll Drive and Victoria Street to expand the campus's capability to distribute reclaimed water to new developments in both the core campus and the University Village area, and to monitor its use. Reclaimed water can have a range of characteristics depending on the source, and these characteristics can have varied adverse effects on plant material. High salinity is a common characteristic of reclaimed water in Southern California. The campus's reclaimed water supply should be tested by a professional laboratory to determine its properties, and plant species should be chosen accordingly.

Notwithstanding the availability of reclaimed water, a major landscape goal for the University Village is to use more plants that are adapted to the local climate requiring less water. In keeping with this goal, irrigated lawns are encouraged only in those areas such as Village Green Park and residential common open spaces to be used for passive recreation.

New landscape areas and upgrades to existing irrigation systems should use drip irrigation for distribution, except in turf

grass areas (Village Green Park and University Village Open Space), where overhead rotary sprays are recommended. In tight corners or narrow strips of turf, and rotors are recommended for large unobstructed swathes. It is recommended that the campus uses a central control system (such as RainBird Maxicom, or Hunter I-Core with Dual 2-wire decoder attachment) to maximize irrigation efficiency in compliance with the State's Model Water Efficient Landscape Ordinance.

LANDSCAPE INTERFACE WITH BUILDING AND ARCHITECTURE

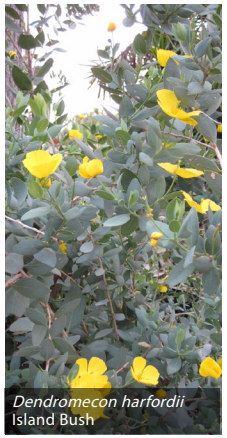
Landscapes Visible from Streets

This section provides guidelines for landscape areas not otherwise described in the landscape guidelines. Landscape character and specifics in the immediate vicinity of street corridors is described in the preceding street corridor guidelines and/or the pedestrian corridor guidelines as well as in various concept design vignettes. Those guidelines and vignettes take precedence over this section in the case of conflicting guidelines.

Safety and openness should dictate general planting design in landscape areas that are not being used to screen views. Plant material selected should leave clear views above 2'-0" and below 6'-0" to maximize visibility from streets, sidewalks, and pathways and to minimize potential hiding spots. Tree and

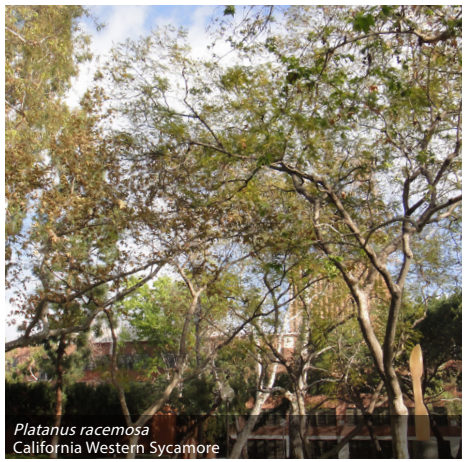
CALIFORNIA ZONE

Achillea millefolium
Western Yarrow



Dendromecon harfordii
Island Bush

Trichostema lanatum
Woolly Blue Curls

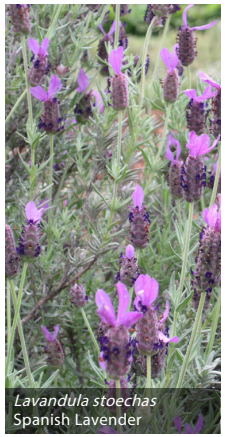


Platanus racemosa
California Western Sycamore

MEDITERRANEAN BASIN ZONE

Echium candicans
Pride of Madeira

Leonotis leonorus
Lion's Tail



Lavandula stoechas
Spanish Lavender

Phoenix dactylifera
Date Palm

CAMPUS EDGE

Grevillia winpara 'Gold'
Gold Grevillia

A. flexuosa 'After Dark'
Peppermint

Anigozanthos 'Big Red'
Big Red Kangaroo Paw

Eucalyptus citriodora
Lemon Scented Eucalyptus

plant massing should be used to screen views only between public walkways and driveways into private living spaces, or where otherwise specifically called out as screening in these guidelines. For lighting and furnishings refer to those sections in these guidelines.

The 2018 Master Plan Landscape Guidelines direct future planting throughout the campus core and provides for future integration of the University Village development and landscape.

The plant palette spreadsheets from the Guidelines for 2018 Master Plan are edited to focus on the University Village and are included in this section.

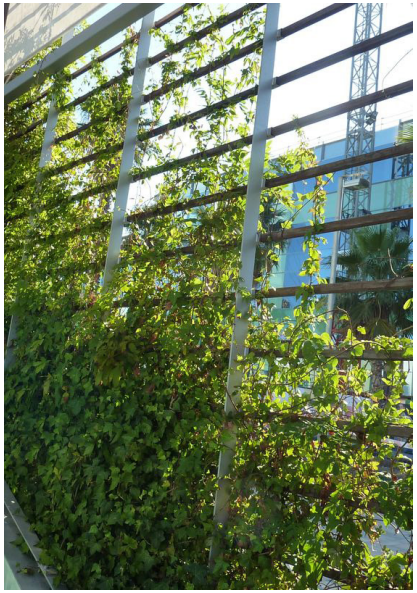
Landscape Modulation of Building Façades

Residential Building Façades

Planting should be used to enhance the residential experience for residents in the University Village. A minimum 10'-0" setback from sidewalks, streets, and pathways to residential building façades is recommended. Refer to Landscape Zones plant palettes for the appropriate plant materials by location. Tree and shrub massings should be grouped so as to screen views from public areas into private residential outdoor spaces as well as into ground floor dwelling units. Trees with a vertical character should be used to visually modulate multi-floor residential building façades. Plant materials can be used to screen views from public areas into semi-private residential spaces, such as courtyards, pool decks, entrances/exits, and leasing campus business park.

Parking Structure Façades

Most of the proposed parking demand for the University Village is accommodated by concealed parking structures integral to the individual buildings as described previously. This strategy frees up landscape areas for outdoor amenity spaces, low-impact development strategies, pedestrian and bicycle circulation, and habitat, and minimizes heat islands and stormwater pollution associated with surface parking. However, the strategy also results in multi-story parking garage façades in some places, which can become visually imposing if not properly treated. Parking garage façades should be screened through the use of climbing evergreen vines. These vines should be selected to satisfy the specific sun/shade condition of the façade. Stainless steel vine cables permanently affixed to the façade can be used to create a framework for vines to climb on. The 5-foot east-side areas of the ground-floor-retail-residential-parking development indicated on Exhibit C-7 are large enough to accommodate multiple layers of planting, columnar growth-habit trees and foundation planting should be installed between the vines and the curb. Screening with plant materials shall be situated and maintained so as not to block signage and site lighting.



PEDESTRIAN CORRIDORS

Birchknoll Drive

Character:

Birchknoll Drive is named for the existing north-south roadway that runs through University Village; the *European White Birch ciltivar* has been assigned as the street tree species for this roadway, which is flanked by sidewalks and bicycle routes.

Materials:

New pedestrian pathways and sidewalks should be natural colored concrete with a Top-Cast 05 (or equal) finish.

European White Birch

Olive Walk

Character:

Olive Walk runs east-west and connects the new ground-floor-retail and residential portion of the University Village with the CSUDH Campus Core. The *Olea Europea* is assigned to Olive Walk.

Materials:

New pedestrian pathways and sidewalks should be natural colored concrete with a Top-Cast 05 (or equal) finish. Decomposed granite paving should be used in tree wells, and for accent in low-traffic areas. Decomposed granite shall have a stabilizer additive where used outside of tree wells.

Olea Europea (Olive Tree)

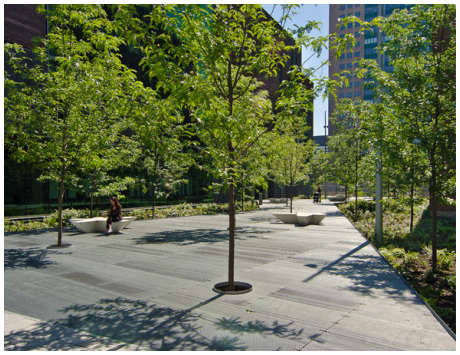
Bridge Walk

Character:

Bridge Walk is named for a portion of the walk on the CSUDH campus where it spans the historic center of campus at an upper level, looking down into the adjacent sunken courtyards, giving the feeling of walking on a bridge. It provides a metaphorical bridge between new student residence halls and the campus core. The Lemon Scented Gum tree is an example of what plant species is to be on Bridge Walk (Also see Chapter 5 of the Guidelines for 2018 Master Plan).

Materials:

New Pedestrian pathways and sidewalks should be an integrally colored concrete (dark gray) with a Top-Cast 05 (or equal) finish.



Eucalyptus Citriodora

Palm Walk

Character:

The trees planted along **Palm Walk** are intended to create a defined pedestrian corridor between the east and west sides of the campus and connect the campus core to the StubHub Center. The use of Chilean Palms in this corridor reflects the Chilean/South African Landscape Zone, and takes cues from the existing planting further west at the StubHub Center. The extension of Palm Walk into the Village north of the student apartments should be planted with palms. Refer to plant palettes for guidance about specific species.

Materials:

New pedestrian pathways and sidewalks should be natural colored concrete with a Top-Cast 05 (or equal) finish.

Chilean Palm Trees

Mesquite Drive/New Roadway South

Character:

In the University Village, New Roadway South is primarily a vehicular route connecting the planned southern parking structures to Central Avenue, and the Facilities Services Complex. The western end of the corridor lies in the South Africa/Chile landscape zone, influencing the selection of the Chilean Mesquite as the signature tree.

Materials:

New pedestrian pathways and sidewalks should be natural colored concrete with a Top-Cast 05 (or equal) finish.

Chilean Mesquite

Oak Walk

Character:

Oak Walk, an east-west walk connects the southern University Village area with the CSUDH campus core. This corridor falls entirely with the Southern California zone, and is characterized by one of the signature native oak species.

Materials:

New pedestrian pathways and sidewalks should be natural colored concrete with a Top-Cast 05 (or equal) finish.

California Nature Oak

Other Pedestrian Routes

Character:

Pedestrian routes not currently defined by the Guidelines for 2018 Master Plan will likely be necessary as new residential buildings are constructed. The new pathways should be aligned to provide a system of safe, logical, and accessible routes between living spaces, retail areas, and campus uses that support the Pedestrian corridors circulation network in the Guidelines for 2018 Master Plan.

Trees/Planting:

- Reference Landscape Zones (Exhibit C-13), Pedestrian Corridors (Exhibit C-12) and the University Village Plant Palette (Exhibit C-24) for applicable species.
- Plant material along pedestrian routes shall be selected that leaves clear views above 2'-0" and below 6'-0" to maximize visibility from the pathway and minimize potential hiding spots.
- Plant massing should be used to screen views from the pathway into private living spaces.

Materials:

- Paving shall be natural colored concrete with a Top-Cast 05 (or equal) finish.
- Benches and seat walls shall be incorporated into pedestrian pathways to encourage informal interactions.

CAMPUS BUSINESS PARK SURFACE PARKING AREAS

Character:

- Campus Business Park land uses occupy much of the Central Avenue street frontage of the University Village area. Heat island reduction strategies for parking areas shall meet or exceed the minimum requirements of Title 24 California Green Building Code. These strategies include shading parking areas with trees, using high-albedo hardscape materials, tuck-under parking, and/or use of open-grid or permeable paving systems.
- There is a significant amount of elevation change in the natural grade between the higher north end of the campus business park and the lower south end. This will likely result in the creation of several relatively level building pads. In order to accommodate the grade change between pads, sloped landscape areas should be created between pads, not to exceed 3:1 slope. Retaining walls may be necessary to accommodate the amount of grade change. If so, they must be designed by a licensed structural engineer and visually modulated with landscaping

Trees/Planting:

- Reference Architectural Guidelines for Campus Business Park Structures for recommended setback and landscape buffer dimensions (Exhibit C-9).
- Plant material along pedestrian routes shall be selected that leaves clear views above 2'-0" and below 6'-0" to maximize visibility from the pathway and minimize potential hiding spots.
- Plant massing should be used to screen views from the campus business park into adjacent residential uses.

Materials:

- Pedestrian pathways shall be natural colored concrete with a Top-Cast 05 (or equal) finish.
- Minimum recommended width for walkways is 5'-0".

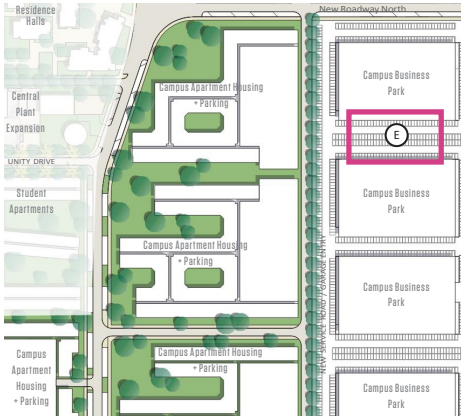


Exhibit C-21:

Campus Business Park Surface Parking

Plan View

FURNITURE PALETTE

The furniture palette for the University Village takes inspiration from the modern architectural design vocabulary on the campus, while providing soft, clean lines to contrast with the rigid building forms. This cohesive palette of materials strengthens the University Village brand and identifies its public domain.

Benches should be installed along all pedestrian routes. For retail areas, they should occur every 50'-0", and in all other areas every 150'-0". Trash receptacles should be located along pedestrian pathways where they approach crosswalks, and along uninterrupted pathways spaced every 150'-0" on average. Bike racks are recommended to be installed on the sidewalks with adequate clearance per manufacturer's recommendations, and spread throughout the block along retail streets.

The specific furniture solutions identified below and shown on this page meet the lighting goals for the University Village neighborhood. Other similar furniture solutions are possible.

BENCH:	Landscape Forms Metro 40 "Rest"
TRASH RECEPTACLE:	Landscape Forms Metro 40 "Collect"
TREE GRATE:	Urban Accessories "Rainbow"
DINING TABLE:	Landscape Forms "Charlie"
BICYCLE RACK:	Landscape Forms Metro 40 "Ride"
BUS SHELTER:	Landscape Forms Metro 40 "Connect"

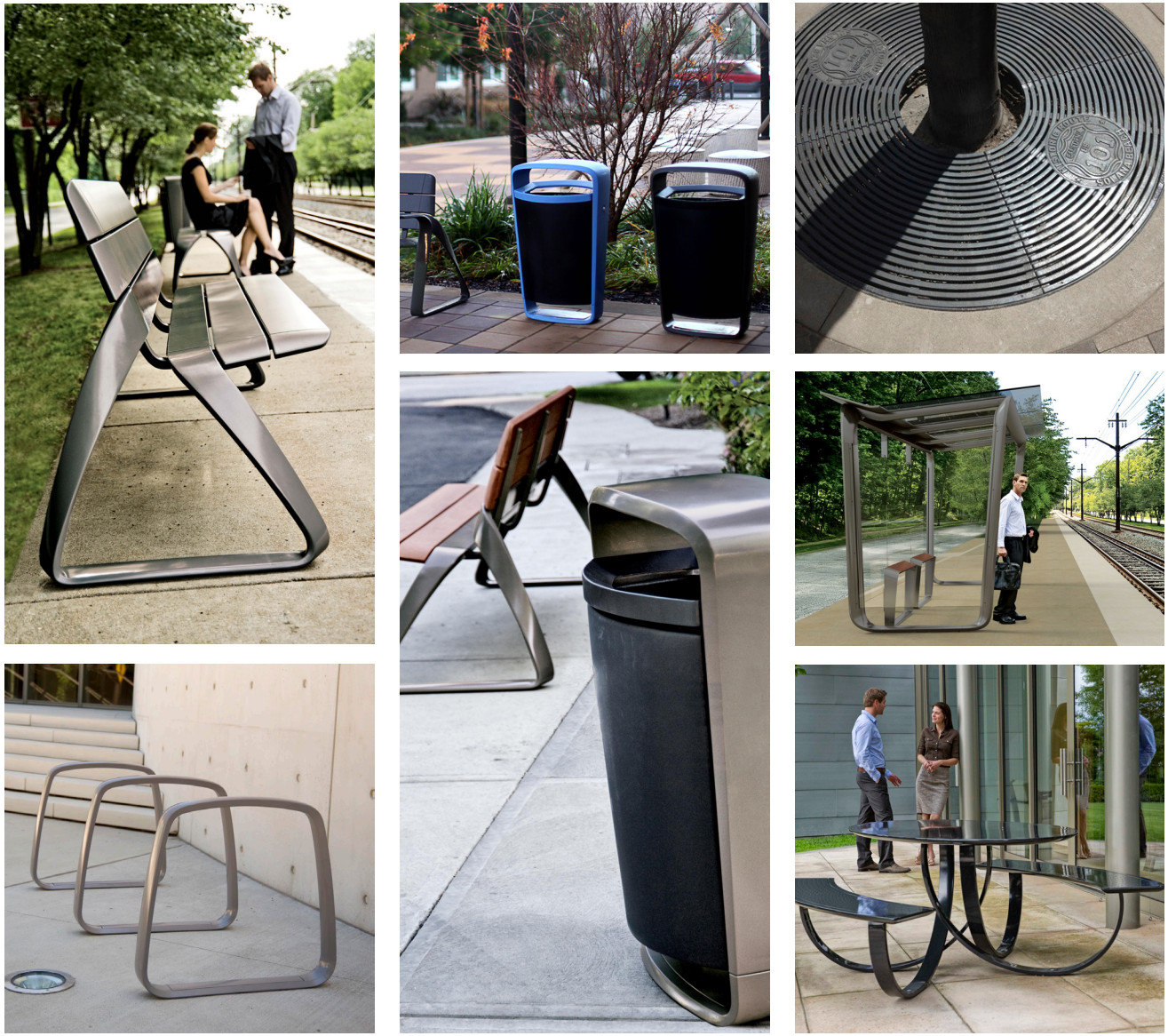


Exhibit C-22: The University Village Furniture Palette

LIGHTING PALETTE

Lighting comes in two forms: vehicular and pedestrian. The vehicular lights (streets and parking lots) are of a simple, modern design and are intended to "disappear" in the skyline. Pedestrian lights are intended for plazas and pathways, and take design cues from the furniture palette. Pedestrian-scale lighting is a key component that promotes safety and helps to create an appealing, walkable environment. Lighting provides spatial definition to the sidewalk, adds ambiance to neighborhood settings and affords a sense of security to users. Pedestrian-scale lighting shall be spaced according to a certified lighting professional's recommendations. The selected light fixtures shall adhere to guidelines set forth by the Dark Sky Association. Light fixtures shall meet code requirements for photometrics and follow the SCE standards for maintenance. (See also Section C.5, *Electric Power Design and Site Development Guidelines*).

The specific lighting solutions identified below and shown on this page meet the lighting goals for the University Village neighborhood. Other similar lighting solutions are possible.

STREET LIGHT (Vehicular):	Bega USA Luminare: LED area/roadway pole top davit arm luminare on 16' tapered round pole with cast round base.
AREA LIGHT (Pedestrian):	Landscape Forms Metro 40 "Hi-Glo" Pole Light
PATH LGIHT (Pedestrian):	Landscape Forms Metro 40 "Lo-Glo" Bollard

Exhibit C-23: University Village Lighting Palette

Trees	Habitat		Form						Zone			Characteristic					Cultural Needs			
	Bird	Pollinator	Tall Upright	Tall Broad	Large Spreading	Small Upright	Small Spreading	Palm	Campus Edge	California	Mediterranean	Deciduous	Evergreen	Flower Color	California Native	Drought Tolerant	Special Watering	Protect from Frost	Plant in Shade	Protect from Wind
Acer macrophyllum *Bigleaf Maple*	■		■							■		■			■		■			
Aesculus californica *California Buckeye*	■	■					■			■		■		w	■	■	■			
Agonis flexuosa 'After Dark' *Peppermint Tree*	■			■					■				■			■	■			
Arbutus unedo *Strawbery Tree*	■	■					■						■	pi		■	■			
Brahea armata *Mexican Blue Palm*	■					■		■					■			■				
Calocedrus decurrens *Incense Cedar*			■										■		■	■				
Cercis occidentalis *Western Redbud*	■	■					■			■		■		pi	■	■		■		
Chilopsis linearis *Desert Willow*	■	■					■			■		■		w	■	■		■		
Chitalpa tashkentensis *(No Common Name)*	■	■					■			■		■		pu		■		■		
Citrus cultivars *Citrus*	■	■				■							■				■	■		
Cupressus sempervirens 'Fastigiata' *Italian Cypress*	■												■			■		■		
Eucalyptus citriodora *Lemon Scented Gum*	■	■	■						■				■			■	■			
Laurus nobilis *True Laurel*						■							■			■				
Lyanothamnus floribundus *Caltalina Ironwood*	■	■	■							■			■	w	■	■	■			
Olea europaea *'Swan Hill'* *Fruitless Olive Tree*					■								■			■	■			
Parkinsonia aculeata *Mexican Palo Verde*	■	■			■					■			■	y		■	■			
Parkinsonia floridum *Palo Verde*	■	■			■					■			■	y		■	■			
Phoenix canariensis *Canary Island Date Palm*	■		■					■					■			■				

Exhibit C-24: University Village Plant Palette

Trees	Habitat		Form						Zone			Characteristic					Cultural Needs			
	Bird	Pollinator	Tall Upright	Tall Broad	Large Spreading	Small Upright	Small Spreading	Palm	Campus Edge	California	Mediterranean	Deciduous	Evergreen	Flower Color	California Native	Drought Tolerant	Special Watering	Protect from Frost	Plant in Shade	Protect from Wind
Phoenix dactylifera *Date Palm*	■			■				■			▒		■			■				
Pinus canariensis *Canary Island Pine*	■		■								▒		■			■				
Pinus pinea *Italian Stone Pine*	■				■						▒		■			■	■			
Pinus torreyana *Torrey Pine*	■			■						■			■		■	■	■			
Platanus racemosa *California Sycamore*	■	■		■						■		■			■	■	■			
Punica granatum *Pomegranate*	■	■					■				▒	■		o						
Populus fremontii *Western Cottonwood*	■	■	■							■		■			■		■			
Quercus agrifolia *Coast Live Oak*	■	■			■					■	▒		■		■	■	■			
Quercus chrysolepis *Canyon Live Oak*	■	■			■					■			■		■	■	■			
Quercus engelmannii *Mesa Oak*	■	■			■					■	▒		■		■	■	■			
Quercus suber *Cork Oak*	■	■			■						▒		■			■	■			
Salix laevigata *Red Willow*	■				■					■		■			■		■			
Sequoia sempervirens *'SantaCruz'* *Coast Redwood*	■	■	■							■			■		■	■				
Umbellularia californica *California Laurel*	■	■		■						■			■		■	■				
Vitex-agnus castus *Chaste Tree*	■	■		■							▒		■	pu		■				
Washingtonia filifera *California Fan Palm*	■		■					■		■			■		■	■				

Exhibit C-24: University Village Plant Palette (continued)

Shrubs, Perennials, Grasses, Cactus, Agaves, and Succulents	Habitat		Form							Zone			Characteristic					Cultural Needs			
	Birds	Pollinator	Large Spreading	Large Mounding	Large Upright	Low Spreading	Low Mounding	Ornamental Grass	Perennial Accent	Campus Edge	California	Mediterranean	Deciduous	Evergreen	Flower Color	California Native	Drought Tolerant	Special Watering	Protect from Frost	Plant in Shade	Protect from Wind
Achillea millefolium *Yarrow*															y,pi w,r						
Achillea filipendulina *Fernleaf Yarrow*															y, pi,						
Acacia greggii *Catclaw Acacia*															y						
Acanthus mollis *Bear's Breech*															y,w						
Agave 'Blue Glow' *Blue Glow Agave*																					
Agave desertii *Desert Agave*																					
Anigozanthos 'Big Red' *Big Red Kangaroo Paws*															y						
Arctostaphylos 'Emerald Carpet' *Emerald Carpet Manzanita*															w						
Arctostaphylos glauca *Big Berry Manzanita*															w						
Arctostaphylos hookeri *Monterey Manzanita*															w, pi						
Arctostaphylos 'Howard McMinn' *McMinn Manzanita*															pi						
Artemisia californica *California Sagebrush*																					
Artemisia 'Powis Castle' *(No Common Name)*																					
Asclepias speciosa *Showy Milkweed*															pu, r						
Baccharis pilularis *Prostrate Coyote Brush*																					
Berberis aquifolium *Oregon Grape*															y						
Berberis 'Golden Abundance' *Golden Abundance Barberry*															y						
Calamagrostis foliosus *Mendocino Reed Grass*															w						

Exhibit C-24: University Village Plant Palette (continued)

Shrubs, Perennials, Grasses, Cactus, Agaves, and Succulents	Habitat		Form							Zone			Characteristic					Cultural Needs			
	Birds	Pollinator	Large Spreading	Large Mounding	Large Upright	Low Spreading	Low Mounding	Ornamental Grass	Perennial Accent	Campus Edge	California	Mediterranean	Deciduous	Evergreen	Flower Color	California Native	Drought Tolerant	Special Watering	Protect from Frost	Plant in Shade	Protect from Wind
Callisetmon 'Little John' *(No Common Name)*	■	■					■		■	■				■	r		■				
Calycanthus occidentalis *Spice Bush*	■	■			■				■		■		■			■	■			■	
Carex pansa *California Meadow Sedge*						■		■			■			■		■		■			
Carex spissa *San Diego Sedge*					■			■			■			■		■		■			
Carpenteria californica *Bush Anemone*		■			■						■			■	w	■	■				
Ceanothus 'Concha' *Concha Ceanothus*		■		■					■		■			■	b	■	■	■			
Ceanothus 'Joyce Coulter' *Joyce Coulter Ceanothus*		■	■	■					■		■			■	b	■	■	■			
Ceanothus 'Ray Hartman' *Ray Hartman Ceanothus*		■	■	■					■		■			■	b	■	■	■			
Cistus salviifolius Sageleaf Rockrose		■					■		■			■		■	w		■		■		
Dendromecon harfordii *Island Bush Poppy*		■		■					■		■			■	y	■	■				
Dietes species *Fortnight Lily*		■				■			■			■		■	w		■				
Echium candicans *Pride of Madeira*		■		■					■			■		■	pu		■				
Encelia californica *Coastal Encelia*		■					■		■		■			■	y	■	■				
Epilobium canum *California Fuchsia*		■					■		■		■			■	r	■	■				
Euphorbia characias *Large Mediterranean Spurge*							■					■		■			■				
Festuca californica *California Fescue*				■				■	■		■			■		■	■				
Festuca glauca *Blue Fescue*						■		■				■		■				■			
Festuca mairei *Atlas Fescue*						■		■		■		■		■				■			

Exhibit C-24: University Village Plant Palette (continued)

Shrubs, Perennials, Grasses, Cactus, Agaves, and Succulents	Habitat		Form							Zone			Characteristic					Cultural Needs			
	Birds	Pollinator	Large Spreading	Large Mounding	Large Upright	Low Spreading	Low Mounding	Ornamental Grass	Perennial Accent	Campus Edge	California	Mediterranean	Deciduous	Evergreen	Flower Color	California Native	Drought Tolerant	Special Watering	Protect from Frost	Plant in Shade	Protect from Wind
Festuca rubra *Red Fescue*																					
Fremontodendron californicum *California Flannel Bush*															y						
Garrya elliptica 'James Roof' *Silktassel*															w						
Grevillea species *(No Comon Name)*															pi,w , r						
Helianthemum cultivars *Rock Rose*															y, pi, r						
Helictotrichon sempervirens *Blue Oat Grass*																					
Heteromeles arbutifolia *Toyon*																					
Juncus patens *Caliornia Gray Rush*																					
Juncus textilis Basket Rush																					
Juniperus californica *California Juniper*																					
Juniperus chinensis 'Torulosa' *Hollywood Juniper*																					
Justicia californica *Chuparosa*															o, r						
Lavandula angustifolia *English Lavender*															pu						
Lavandula stoechas *Spanish Lavender*																					
Lavatera assurgentiflora *Tree Mallow*															pi						
Leonotis leonorus *Lion's Tail*															o						
Leymus cinereus *Gray Wild Rye*																					
Leptospermum laevigatum *Australian Tea Tree*															pi						

Exhibit C-24: University Village Plant Palette (continued)

Shrubs, Perennials, Grasses, Cactus, Agaves, and Succulents	Habitat		Form							Zone			Characteristic					Cultural Needs			
	Birds	Pollinator	Large Spreading	Large Mounding	Large Upright	Low Spreading	Low Mounding	Ornamental Grass	Perennial Accent	Campus Edge	California	Mediterranean	Deciduous	Evergreen	Flower Color	California Native	Drought Tolerant	Special Watering	Protect from Frost	Plant in Shade	Protect from Wind
Mimulus guttatus *Seep Monkey Flower*															y						
Muhlenbergia rigens *Deer Grass*																					
Muhlenbergia lindheimeri *Lindheimer's Muhly*																					
Nassella pulchra *Purple Needle Grass*															pu						
Pelargonium spp. *(No Common Name)*															w,r pi						
Penstemon hybrids *Bearded Tongue*															pi, pu						
Phlomis fruticosa *Jerusalem Sage*															y						
Plumbago auriculata *Cape Plumbago*															b, w						
Punica granatum 'Nana' *Pomegranate*															o						
Rhus ovata *Sugar Bush*															pi						
Romneya coulteri *Matilija Poppy*															w						
Rosa californica *Californica Wild Rose*															pi						
Rosmarinus officinalis *Rosemary*															b						
Salvia 'Allen Chickering' *Allen Chickering Sage*															pu						
Salvia clevelandii *Cleveland Sage*															pu						
Salvia greggii *Autumn Sage*															pu, r, pi						
Salvia leucantha *Mexican Sage*															pu						
Senecio spp. *Blue Chalk Sticks*																					

Exhibit C-24: University Village Plant Palette (continued)

Shrubs, Perennials, Grasses, Cactus, Agaves, and Succulents	Habitat		Form							Zone			Characteristic					Cultural Needs			
	Birds	Pollinator	Large Spreading	Large Mounding	Large Upright	Low Spreading	Low Mounding	Ornamental Grass	Perennial Accent	Campus Edge	California	Mediterranean	Deciduous	Evergreen	Flower Color	California Native	Drought Tolerant	Special Watering	Protect from Frost	Plant in Shade	Protect from Wind
Sisirinchium bellum *Blue-Eyed Grass*															b						
Stachys byzantina *Lamb's Ear*															pu						
Thymus species *Thyme*															pu						
Trichostema lanatum *Woolly Blue Curls*															pu						
Vitex agnus-castus *Chaste Tree*															pu						

Exhibit C-24: University Village Plant Palette (continued)

	Habitat		Form						Zone		Characteristic					Cultural Needs			
Ground Covers	Birds	Pollinators	Low	Mounding	Shrubby	Small Areas	Large Areas	Perennial Accent	California	Mediterranean	Deciduous	Evergreen	Flower Color	California Native	Drought Tolerant	Special Watering	Protect from Frost	Plant in Shade	Protect from Wind
Achillea millefolium *Fernleaf Yarrow*		■					■	■	■			■	y,r, pi, w	■	■	■			
Aptenia cordifolia *Hearts and Flowers*			■				■	■	■			■		■	■	■			
Arctostaphylos 'Emerald Carpet' *Dwarf Manzanita*	■	■		■	■		■		■			■	pi, w	■	■	■			
Arctostaphylos uva-ursi 'Point Reyes' *Dwarf Manzanita*	■	■		■	■		■		■			■	pi, w	■	■	■			
Baccharis pilularis 'TwinPeaks' *Coyote Brush*	■			■	■		■		■			■		■	■	■			
Berberis repens *Creeping Barberry*	■				■	■		■	■			■	y	■	■	■		■	
Bougainvillea spectabilis *Bougainvillea*			■	■			■	■				■	r		■	■	■	■	
Ceanothus g. hor. 'Santa Ana' *Carmel Creeper*	■	■		■	■		■		■			■	b	■	■	■			
Ceanothus maritimus *Maritime Ceanothus*	■	■		■	■		■		■			■	b	■	■	■			
Dalea greggii *Trailing Indigo Bush*		■	■	■			■	■	■			■	b	■	■	■			
Eriogonum fasciculatum 'Dana Point' *Dana Point Buckwheat*	■	■		■	■		■	■	■			■		■	■	■			
Eriogonum f. 'Theodore Payne' *Theodore Payen Buckwheat*	■	■		■	■		■	■	■			■		■	■	■			
Euphorbia rigida *Silver Spurge*			■		■		■					■	y		■	■			
Fragaria chiloensis *Sand Strawberry*			■			■	■	■	■			■	w	■					
Hedera canariensis *Akgerian Ivy*			■			■		■				■			■	■			
Heuchera maxima *Island Alum Root*		■	■			■		■	■			■	pi	■	■			■	
Heuchera sanguinea *Coral Bells*		■	■			■		■	■			■	pi	■	■			■	
Iva hayesiana *San Diego Marsh Elder*			■				■		■			■		■	■				

Exhibit C-24: University Village Plant Palette (continued)

	Habitat		Form						Zone		Characteristic					Cultural Needs			
Ground Covers	Birds	Pollinators	Low	Mounding	Shrubby	Small Areas	Large Areas	Perennial Accent	California	Mediterranean	Deciduous	Evergreen	Flower Color	California Native	Drought Tolerant	Special Watering	Protect from Frost	Plant in Shade	Protect from Wind
Lantana c. 'Spreading Sunshine' *Yellow Lantana*													y						
Lantana montevidensis *Trailing Lantana*													p						
Leymus triticoides *Creeping Wildrye*																			
Mahonia repens *Creeping Mahonia*													y						
Ribes viburnifolium *Catalina Perfume*																			
Rosmarinus o. 'Lockwood de Forest' *Prostrate Rosemary*													b						
Rosmarinus o. 'Prostratus' *Prostrate Rosemary*													b						
Salvia 'Bee's Bliss' *Bee's Bliss Sage*													b						
Salvia l. 'Point Sal Spreader' *Point Sal Spreader Sage*													b						
Salvia sonomensis *Creeping Sage*													b						

Exhibit C-24: University Village Plant Palette (continued)

Vines and Espaliers	Habitat		Form					Zone		Characteristic					Cultural Needs			
	Birds	Pollinator	Large	Small	Vine	Espalier	Self Clinging	California	Mediterranean	Deciduous	Evergreen	Flower Color	California Native	Drought Tolerant	Special Watering	Protect from Frost	Plant in Shade	Protect from Wind
Beaumontia grandiflora *Easter Lily Vine*	■	■	■		■				■		■	w				■		
Bougainvillea sp. *Bougainvillea*	■	■	■		■				■		■	r, pi o,		■		■		
Citrus cultivars *Citrus*	■	■		■		■			■		■				■	■		
Clematis lasiantha *Chaparral Clematis*		■			■			■				w	■	■				
Distictis buccinatoria *Blood-Red Trumpet Vine*	■	■	■		■				■		■	r						
Ficus pumila *Creeping Fig*			■		■		■		■		■							
Jasminum humile *Italian Jasmine*		■			■				■		■	w, pi						
Lonicera hispidula *Twin Berry*	■	■			■			■				w, y	■	■				
Lonicera subspicata *Chaparral Honeysuckle*	■	■			■			■				pi	■	■				
Punica granatum *Pomegranate*	■	■		■		■			■	■		o		■				
Pyrostegia venusta *Flame Vine*	■				■				■		■	o						
Solandra maxima *Cup-of Gold Vine*	■	■	■		■				■		■	y				■		
Vitis californica *California Wild Grape*	■	■			■			■		■			■	■		■		

Exhibit C-24: University Village Plant Palette (continued)

C.5 CIVIL, ELECTRIC POWER AND MECHANICAL SYSTEMS: DESIGN AND SITE DEVELOPMENT GUIDELINES AND CRITERIA

CIVIL DESIGN AND SITE DEVELOPMENT GUIDELINES

General

1. Developers must consider and provide for utility corridors to each lot in development. In general, utility corridors are planned for future and existing vehicular paths; however, pedestrian only paths may be considered. In most cases the development of such corridors will require, at a minimum, rough grading from the points of connection to the building lot frontages. Rough grading must provide grade that matches final conditions as closely as possible. Rough grading must be stabilized to prevent erosion in a long-term condition.

2. A Utility Master Plan shall be prepared for all site utilities. Conceptual utility plans were prepared based upon the Illustrative Plan and associated development parameters included in the University Village Design Guidelines document and are included as appendices to the California State University Dominguez Hills Guidelines for 2018 Master Plan. Other approaches to providing utility services to the University Village project as ultimately proposed may differ from the conceptual utility plans included in the appendices to the Guidelines for 2018 Master Plan.

3. Utility services to lots must follow Master Plan routing to prevent redundant lines, same-utility crossings and dead ends. This may require completion of a backbone line if other lots are not developed in a particular sequence. Utility backbones must consider loads and demands of other developments.

Survey and Controls

1. Show survey Bench Marks and Basis of Bearings tied to external, permanent bench marks. The campus has a system of permanent bench marks throughout the campus. Regardless of campus control points and documentation, tying project components to external controls is required. External controls may be county, city or other government agency survey controls that have been recorded with the local jurisdiction.

2. At a minimum, comply with the scope in the Rider for professional surveys for CSU projects found at *www.calstate.edu/CPDC/ae/pro-serv-agree/service.shtml*.

3. The project civil engineer does not typically provide the site survey, but the civil engineer shall verify that the survey meets the criteria referenced above before proceeding or continuing with site design.

4. When possible, the project engineer shall add scope and tasks to the site survey that are required for completion of the site civil engineering.

Grading

1. The finish floor of the building or facility shall be set to ensure positive drainage from the site. Positive drainage means that if the site experiences ponding in exterior areas if a pipe or pipes or a catch basin or catch basins are blocked, the building will not experience water intrusion, including in basement spaces. Overflows will drain from the site or be contained in sump areas without entering the building.

2. The grading and drainage plan shall show a drainage path from each drainage area in the event that catch basins or pipes become blocked. Sump conditions shall be avoided unless overflow elevations are below the finish floor.

3. Site drainage should be the first consideration in the design process for setting finish floor elevations for new buildings. The finish floor of the building or facility shall be set to minimize ADA ramps; however, the addition or inclusion of ADA ramps in the project is secondary to consideration of site drainage. It is difficult, and in some cases impossible, to mitigate drainage deficiencies at a building caused by setting the finish floor of a building too low.

4. Drawings shall include site sections that show relationships between new and existing grades and join lines on both ends of the sections.

Utilities

1. The finish floor of the building or facility shall be set to create gravity flow to the nearest or most accessible sanitary sewer.

2. If a sanitary sewer lift station is necessary, the lift station shall be designed with a holding vessel that optimizes pump size and vessel volume to attenuate peak flows from the building/facility. If available, peaking factors shall be taken from existing similar

buildings/facilities on campus. A backup generator with an automatic transfer switch shall be provided.

3. The Basis of Design narrative for civil utilities shall discuss the attenuation of peak sanitary sewer flows. If pumping is required, the Basis of Design shall include the sizing of the holding vessel, sizing of pumps and the need for a back-up generator.

4. Provide calculations that show that sanitary sewers achieve minimum scour velocities.

5. Provide hydraulic calculations that show that storm drains transmit peak flows from the design storm event.

6. Provide profiles of all gravity flow pipes with stationing that coordinates with a plan at the same horizontal scale. Stationing shall begin at the downstream end with a station larger than 0+00. Profiles shall show all known existing underground utilities and depict show any required clearances.

7. Provide calculations that show the fire service will deliver a minimum flow rate and a minimum pressure at the building face in accordance with the California Building Code and local fire department requirements. The calculations shall be based on the results of fire hydrant tests conducted by the campus or water purveyor.

8. The civil site utility plan shall include dimensioned locations to all civil utilities. The civil site plan utility plan shall show clearances between civil and utilities from other disciplines. Utilities from other disciplines can be shown without dimensioning; however, a discipline-specific site plan shall show dimensioned locations if they are not shown on the civil plan.

9. Provide a composite site utilities plan that shows all crossings for all utilities. The civil engineer will prepare a drawing that coordinates all site utilities using civil design criteria and design criteria provided by other disciplines.

Roadways, Bicycle Ways and Pedestrian Walkways

1. Provide centerline and/or flowline profiles for all new vehicular roadways on the project. Profiles shall also be included in the Construction Documents (CDs) for roads that are rehabilitated, widened, or extended if there are any changes to the existing grades. New pavement sections shall be based on the recommendations of a registered Geotechnical Engineer.

Road design shall include typical cross sections that show existing ground/surface line, existing and new pavement sections and join lines on both sides. Create a new typical section for each major change in conditions and each roadway. Typical sections should show:

- Typical cross slopes
- Right-of-Way (R/W) and property and/or parcelization lines
- Sidewalks with typical cross slopes
- Typical Curb or Curb & Gutter
- Parkways with typical tree well locations as needed
- Any known existing conditions that could impact bidding or construction costs
- Dimension typical widths from centerline to:
  - Right-of-way line to Right-of-way line
  - Curb face to curb face
  - Sidewalks
  - Parkways
  - Utility easements
  - Typical side slopes to join existing grades

2. Accessible paths of travel shall be coordinated with the architectural drawings. The grading plan shall show paths of travel that comply with CSU Accessibility guidelines found at: *www.calstate.edu/CPDC/ae/gsf/documents/2011-CSU-Access-Design-Guidelines.pdf*.

Site Drainage and Storm Water Management

1. Site drainage shall be sized to transmit a 10-year storm event from the site with no standing water on site. The 10-year storm shall be determined using the local agency hydrology methods and manual. Sump conditions on site shall be designed to transmit a 25-year storm event. The civil engineer must prepare and submit calculations that show that this requirement is met.

2. Drainage design must account for flows from upstream areas and must protect downstream areas on campus and off campus. In general, site drainage should be designed to transmit on the surface to the extent feasible so that peak runoff rates are kept to a minimum by maintaining or increasing the Time of Concentration of runoff. The design must show the following:

- that the site is capable of transmitting runoff from areas upstream of the site,
- that the site is protected from runoff from areas upstream of the site,
- that the site does not backup or divert upstream runoff into areas outside of the project site,

- that peak runoff rates do not exceed the capacity of downstream campus drainage systems,
- that areas downstream of the project site are protected from runoff from the project site.

3. Storm water mitigation must comply with the Water Resource Board Phase II MS4 permit requirements for Non-traditional MS4s. The civil engineer must prepare and submit calculations that show this requirement is met.

4. The Basis of Design for civil and site work shall discuss the peak storm events used for drainage design, the integration of drainage design with storm water treatment and retention systems that comply with MS4 permit requirements. The Basis of Design shall clarify the difference between storm drainage and storm water mitigation. Storm drainage is the drainage and protection of the site from storm water. Storm water mitigation are design components required for compliance with the Phase II General Permit for Storm Water Discharges from Small Municipal Separate Storm Sewer Systems and other site design elements included for environmental or sustainable design efforts, such as LEED and CHPS.

5. For projects that disturb less one acre of soil, the civil drawings shall include an erosion control plan, or alternatively, construction contract documents must direct the contractor to submit and obtain campus approval of an erosion control plan before being allowed to mobilize and occupy the site. Construction contract documents shall provide cites and references to the Construction General Permit for Storm Water Discharges [from Sites] Associated with Construction and Land Disturbance Activities (found at: *http://www.waterboards.ca.gov/water_issues/programs/stormwater/constpermits.shtml) and to the Phase II General Permit for Storm Water Discharges from Small Municipal Separate Storm Sewer Systems (found at http://www.waterboards.ca.gov/board_decisions/adopted_orders/water_quality/2013/wqo2013_0001dwq.pdf*) .

6. For projects that disturb one acre or more, the construction contract documents shall require that the contractor provide the services of a Qualified Storm Water Pollution Prevention Plan (SWPPP) Developer (QSD), produce a SWPPP, file a Notice of Intent (NOI) for the project and provide the services of a Qualified SWPPP (SWPPP) Practioner (QSP) during construction. This contractual organization makes the contractor responsible for site storm water management and reduces disputes in the event of a citation by the State or Regional Water Resources Control Boards.

7. If the campus chooses to include the SWPPP for construction activities in the A-E scope of work, the A-E shall employ the QSD, but not the QSP. The QSP shall be employed or contracted by the contractor.

Miscellaneous

1. Horizontal Control Plans are not listed in submittal requirements; however, on complicated, large or projects on which site drawings become crowded a horizontal control plan will provide clarity.

2. Key Maps/Plans are not listed in submittal requirements; however, for a road or underground utility project they can be a necessity if plans and profiles span more than one drawing.

3. Phasing Plans are not listed in submittal requirements; however, CSUDH may require them to maintain access or keep facilities in operation during construction. If included, phasing plans shall be done in close coordination with the campus and/or the approving authority.

4. Demolition Plans should generally show the entire site to be razed or cleared and notes shall identify specific improvements to protect. The plan shall be used to clearly and specifically delineate where saw cut lines are to be and what the campus wants protected. A demolition plan does not need to show cut lines and pavement removals for only utility service lines. A typical detail for a utility trench will show trench width, pavement/surface removals and replacement, backfill and conduit bedding. A site demo plan needs to be coordinated with the architectural demolition plan.

5. The campus will contract with an experienced, licensed civil engineer who will provide civil engineering design peer review services for each project. Site design is unique to every project and all site conditions and design elements may not be covered in the above guidelines. The civil designer shall be prepared to address comments from this peer review.

ELECTRIC POWER DESIGN AND SITE DEVELOPMENT GUIDELINES

General

1. The existing University 16.5kV service does not have sufficient capacity to supply electric power to any of the buildings or occupancies within the University Village development. Developers must coordinate and review the existing SCE electrical infrastructure within the University Village and contact Southern California Edison (SCE) to establish the electric service requirements for each building, including infrastructure development consisting of duct banks, manholes, and building service laterals, building transformers, and metering. Developers shall inquire with SCE regarding California Public Utilities Commission (CPUC) Rule 15, Distribution Line Extension. Responsibility for ownership operation of the University Village distribution system will be determined in discussions among the University, SCE and, if appropriate, developers.

2. Where sub-metering of electric power for separate premises is required, it shall comply with CPUC Rule 18 and SCE metering requirements. Developers shall also comply with sub-metering and energy use monitoring requirements included in the California T24 Energy Code, and California Green Building Code for building disaggregation of plug load, lighting load, and other loads. Electric vehicle charging circuits, photovoltaic, and other renewable energy sources also require separate metering.

3. The initial system design discussions with SCE will require knowledge of the ultimate load that SCE will be requested to supply. SCE will require a load forecast in order to establish the underground feeder cable rating required and SCE distribution network design and circuiting requirements.

4. A Basis of Design narrative for the electric power infrastructure and building service requirements shall be prepared to establish the requirements for all building projects to follow.

5. Above ground utility infrastructure shall be concealed or otherwise shielded from public views as described in the Landscape Architectural Guidelines and Architectural Design Guidelines sections of this University Village Design Guidelines document.

Power Infrastructure Design

The design and installation of the electric power infrastructure shall be based on the SCE Underground Service Requirements (UGS), the University Village civil engineering site development plan, rough grading plan and parcel map for the entire site. Rough grading elevations for the entire University Village area will be needed to establish the elevation below grade for installation of all utilities. The electric power infrastructure design criteria will be established by SCE with respect to conduit size, conduit quantity, duct bank lengths, manhole style, size and location, building service laterals, site distribution sectionalizing switch locations, and other elements required for a complete system. The developer has the option to prepare the design of the infrastructure for SCE review or to have SCE prepare the design for a fee. In either case, SCE will require payment of engineering fees at some level for service planning and engineering.

Service and Distribution Equipment Location

SCE service to each building will be determined by the Electrical Engineer of Record (EEOR). The service voltage can be 16,500V, 480V, or 208V. SCE has a building service capacity limit of 4000A at 480V or 208V. SCE will install padmount transformers. They are usually installed outdoors on pre-cast pads, and will be located near the building main switchboard. The location of the building service transformer must allow for access, working clearance, and be protected from damage and traffic. SCE will also install padmount sectionalizing equipment to allow for distribution feeder switching, load balancing, and operations.

Building Service Switchboard

SCE can provide multiple service switchboards to a single building if the building load is calculated to exceed a single SCE padmount transformer capacity, which is typically 3750kVA. The EEOR can request service at 16,500V. In this case the customer pays for 25kV rated main disconnect and metering. Sub-metering would have to comply with CPUC Rule 18.

The building service must comply with SCE Electrical Service Requirements (ESR) details and standards. SCE limits the quantity of sub-meters associated with a single service disconnect. The building electrical room or rooms will need to comply with SCE metering and access requirements.

Code and CSU Energy Metering

The California Title 24 Energy Code and California Green Building Code both require provisions for metering and energy usage for plug load, lighting load, and other loads. This metering is in addition to SCE revenue metering and can be provided for in a number of different ways. Energy use sub-metering, while required by T24, is also a CSU system requirement. Provisions for sub-metering will be reviewed by the Univer-

sity representative/approving authority. Separate metering for renewable energy and electric vehicle charging circuits is also required.

Street Lighting

Coordinate the design and source requirements for street lighting with the University and SCE. Street lighting can be supplied from an SCE provided circuit, from a building service, or from dedicated vaults or padmount transformers that are separately metered and dedicated for street lighting. Street lighting shall provide for roadway illumination. It is recommended that pedestrian crossings, intersections, building entrances, and driveways have increased (higher) illumination levels.

Parking Lot and Pedestrian Lighting

All outdoor lighting associated with each parcel and building must comply with Title 24 Energy Code requirements for energy use, dimming and occupancy sensing. In addition, the University Village architectural standards will inform pole and luminaire selection as to type, finish, aesthetics, color temperature and other qualitative aspects. Outdoor lighting must provide minimum illumination levels for all pedestrian paths and roadways in accordance with Local Codes and Standards, Campus Standards and the Illuminating Engineering Society of North America (IESNA) guidelines. Outdoor luminaire design shall consider shading from vegetation that will reduce illumination levels. Outdoor lighting circuits for each parcel shall be monitored by the building lighting control system for both operation and control. It is recommended that certain outdoor luminaires be supplied from an alternate source of power during a power outage in order to illuminate a pathway or point of refuge or public transportation. Lighting levels for safety and security shall meet the standards established by the IESNA for parking lots. Exterior lighting adequacy will also be influenced by safety and security of students and faculty in areas adjacent to the CSUDH campus. Exterior lighting in and around the campus buildings and night time lighting controls will be subject to campus review to assure that campus community security is not compromised.

Emergency Power

Each building shall include a source for emergency power in order to comply with Life Safety Code. A cluster of buildings may be supplied from a single generator, however, the ultimate load is needed at initial installation. The design criteria for loads to be supplied from emergency power needs to be established.

The University Village Site Power Relocation and Demolition

There are existing SCE and University 12,000V and 16,500V duct banks and manholes that are installed in the University Village that will require isolation prior to demolition. SCE provides service to the commercial buildings located at the northeast corner of the University Village, Phase 1 Student Housing (SH-1), and the Facilities Services building. The University provides power to Phase 2 Student Housing (SH-2), the Child Development Center and the Infant Toddler Center. The removal or relocation and replacement of SCE service feeders must be coordinated with SCE. The removal or relocation of University power system must be coordinated with the University.

SITE INFORMATION TECHNOLOGY AND COMMUNICATIONS INFRASTRUCTURE GUIDELINES

1. The University Village will be supplied with telephone and communications, internet, cable, wireless and other information technology services from a variety of service providers, including the University, through a common underground duct structure consisting of 4” conduit, manholes and building service laterals. The design of the communications infrastructure must support the University Village requirements for connectivity for:

- Telephone: VoIP, wireless, wired
- Life safety systems including fire alarm
- Security systems including access requirements, cameras, CCTV, devices
- Emergency call stations
- Emergency system notification networks for local and regional agencies
- Internet access
- Wireless networks including LAN deployment
- Private networks
- CSUDH campus network connections and services
- Data processing
- Other applications and technologies requiring wireless and wired communications

2. The telecommunications and data infrastructure shall be designed based on service provider requirements and the following:

- EIA/TIA/BICSI Standards (EIA/TIA)
- CSU system TIP standard (CSU)

3. A Basis of Design document establishing the Telecommunications Infrastructure Design Standards will need to be prepared that will be applicable to all buildings and infra-

structure installed in the University Village. This document will be provided to service providers and design teams to assure a common understanding regarding design and installation criteria.

4. The Outside Plant infrastructure design will require a minimum of sixteen (16) 4”C configured in a loop around the University Village to allow for backbone cabling to be installed. The loop will have multiple divergent pathways to off-site connections for fiber backbone connections to service provider networks.

5. Manholes shall be a minimum of 6’W x 10’L x 7’H. Pullboxes shall be a minimum of 3’W x 5’L x 4’H.

6. Outside Plant (OSP) underground pathways shall be schedule 40 PVC conduit. Runs shall be limited to 300 feet in length, maximum, and no more than 180˚ of bends. Bends shall be large radius to reduce pulling tension and damage to cables.

7. Install separate 4”C conduits for each service provider from the main infrastructure manholes into each building MDF. Determine the quantity of conduits from each service provider. Include spare conduits for future use by additional service providers.

8. Install Maxcell innerduct in each 4”C to allow for the conduit to be sub-divided and for future cable installation in existing conduit.

9. Data networks require continuous power. Each service provider will provide their own equipment and load requirements. Power supplied to MDF rooms shall be based on load calculations for equipment, receptacles and lighting. The building MPOE and MDF design shall include considerations for normal and standby power, as well as data equipment room cooling. UPS units are typically installed to provide uninterruptable power. Space for generators and cooling equipment shall be identified int he building programming.

10. Service providers may require separate space for their equipment rather than co-location. MPOE and MDF rooms shall be accessible 24 hours a day. Identify service provider equipment space requirements and access requirements during site infrastructure and building design.

11. Data and telecom infrastructure serving any new development will need to be planned to incorporate vision of the campus infrastructure planned for the immediate area. The best possible outcome is to provide a backbone system that can serve proposed buildings as well as other development planned for the local area. Options and cost impacts related to planned incremental development of data and telecom infrastructure must be presented to the campus and meaningful options explored.

12. The University will install fiber optic cable within the University Village and will require four (4), 4”C dedicated conduits for University use within the Outside Plant (OSP) infrastructure.

13. The University will provide CENIC broadband connectivity for any academic facilities or facilities that support academic purposes. Contact the University IT Department regarding CENIC network service.

14. The University will provide access to the campus network through extension of the fiber backbone and network. Wireless access points can also be provided in student and faculty housing and retail areas.

15. Comply with ADA requirements for MDF room access by service personnel.

16. MDF room size shall comply with EIA/TIA 569-A-8.2.2.4 recommendations at a minimum. Mechancial requirements shall comply with EIA/TIA 569-A-8.2.3.6.1. MDF, BDF and data closets shall be conditioned.

17. The telecommunications systems grounding shall comply with EIA/TIA 607 requirements.

18. Security and access control for telecommunications rooms shall be provided, monitored and controlled.

19. The University Village includes existing campus IT infrastructure that provides IT service and connectivity to the Plant Operations Building. Child Development Center, Infant Toddler Center, Student Housing Phase 1, Student Housing Phase 2, and parking lots 1, 2 and 7. These buildings and areas will need to remain connected to the campus network until they are demolished. The Infant Toddler Center and Child Development Center will remain in service indefinitely and throughout construction. Provisions for new infrastructure must be included in the site utility planning. The new infrastructure will need to be installed prior to demolition of existing infrastructure, or temporary IT system provisions will be required during construction.

20. When existing infrastructure in the ground is abandoned and new infrastructure is provided, options for abandonment need to be evaluated and presented to the campus. While it may be cost prohibitive in some cases to completely remove sub-surface infrastructure that will not be reused, other options such as markings, update of as-built drawings to identify areas where obsolete utilities have been abandoned in place must be considered for incorporation into the overall development plan.

MECHANICAL SYSTEMS: DESIGN GUIDELINES

General

1. California State University (CSU) Seismic Review Board (SRB) review is required on building and mechanical equipment structural design.

2. CSU Mechanical Review Board (MRB) review optional and not mandatory. However, design review by the campus master plan engineers shall be conducted especially with respect to life costs, sustainability features and connections to campus central plant and other systems.

3. Design peer review encourage in the event there is no MRB review.

4. Plan check by CSU Plan Check entity selected by the campus.

5. Progress design submittals at Schematic, DD, 50% CD and 95% CD required.

6. Provide independent commissioning of buildings. Cx agent should be working for the owner and not the contractor.

Building Design Guidelines

1. Meet latest California Title-24 requirements.

2. Indoor design criteria as well as outdoor design conditions for sizing of HVAC also per Title 24.

3. LEED certification recommended.

6. Meet BACNET compatibility on Building Control Systems.

7. Prefer Johnson Controls Metasys DDC .

8. Design roof for maximizing future solar installation.

9. Provide metering linked to building DDC for monitoring heating, cooling and domestic hot water.

10. Minimize heat losses by using in-building boilers rather than central heating systems.

11. Chilled water system can be either at building level or at a central plant level with a distribution system. Whenever possible, leverage central plant / satellite plant type infrastructure for cooling to achieve higher operating efficiencies, minimize maintenance intensive equipment and utilize central energy storage.

12. Include noise and acoustic criteria in the building design at an early stage of design. Consider noise impact of chillers, towers and boilers in overall design.

Infrastructure Considerations

1. If underground piping is entailed, use pre-insulated and jacketed HDPE Plastic for chilled water and pre-insulated thermacor steel piping with leak detection systems for hot water.

2. When development entails a cluster of buildings, give first priority to consideration of central/satellite plants for cooling.

3. For gas connections, minimize repeated excavations associated with gas pipes and size and arrange gas piping in collaboration with Southern California Gas company planners.

4. Provide seismic isolation valves and gas meters at each building entrance.

5. Provide vaults for any isolation valves. Direct burial of valves is not permitted.

6. Provide engineered expansion loops, anchors and thrust blocks.

7. Provide isolation valves in building mechanical room to isolate building from any exterior distribution systems and provide valves at branch take offs from any central distribution system.

Building Mechanical Systems: General Considerations

1. Outdoor units – If roof mounted outdoor units are approved, ensure corrosion protection provisions. Specify copper on copper; Use bearings, shafts, dampers, actuators and enclosures built for corrosion resistance and long life.

2. Avoid numerous fan coils and condensing units scattered all over the building as part of design solution unless there is no other practical alternative. Fan coils have noise issues to be considered and maintenance issues on fan coils, control valves, drains, etc. are significant.

3. Exterior ducts – Avoid or minimize roof mounted ducts to minimize duct corrosion and damage due to extended exposure to weather. If exterior ducting is proposed, it must be specifically justified to the campus master plan engineers during schematic design. Use round ducts whenever possible on roofs.

4. Coils - copper: To provide improved corrosion resistance, use copper fins and copper tubes in heating and cooling coils. Do not exceed 10 fins per inch.

5. Condensate trap – To reduce long term maintenance and improve reliability, avoid condensate pumps at the drain of air handlers. If their use is inevitable, have dual condensate pumps with a common sump for improved reliability.

6. Duct and pipe velocities – Use ASHAE recommended limits on duct velocity; In areas with exposed duct work, limit velocity to 750 ft/minute. For hydronic piping, size to limit losses to 4 ft./100 ft.

7. Duct lining and sound transmission – Where equipment noise may be carried through, use duct lining for first 15 ft. of the duct. Use double wall perforated lining in plenum in air handlers to cut down noise propagation to occupied spaces.

8. Coil face velocity – Limit coil face velocity to 450-500 ft./Minute for energy efficiency.

9. Control valves / energy valves – Use pressure independent and automatic flow measuring energy valves in large air handlers.

10. Utility metering and sub metering – If energy valves are used, energy metering is included in the valves. If they are not used, provide chilled water, hot water, domestic hot water and potable water metering in the building.

11. Where chilled water or hot water pumping is required, use n+1 redundancy in the pumping system. If one pump fails, the standby pump must be able to deliver peak flow demanded by the building.

12. Natural ventilation and mechanical ventilation – Unless there is an engineered natural ventilation that assures ventilation to occupants under all conditions, include mechanical ventilation in all spaces and even those provided with natural ventilation.

13. Air intake with mist eliminator – size air intake to not exceed ASHRAE recommended air intake velocity (500 ft/Minute). Use mist eliminators in place of pre-filters.

14. Use variable refrigerant flow technology (VRF) in place of numerous condensing units – rather than have numerous condensing units, consider a VRF unit for lower long term maintenance.

15. Flex couplings – Use at all pumps, chillers, towers, and coil connections to protect equipment and absorb any vibration transfer to the piping.

16. Petes plugs – use generously in hydronic piping to help make diagnosis of operating conditions.

17. Domestic hot water – Prefer point of use systems OR systems with more intelligent control of pump recirculation. Incorporate safety in design to ensure that hot water distributed does not exceed safe limits (e.g., 115 deg. F).

GENERAL SCREENING OF INFRASTRUCTURE

General Requirements

- All new utility lines shall be placed underground
- All aboveground utility-related equipment such as transformers and pedestal terminals, which are visible from an adjacent street or walkway, shall be located within a solid enclosure or otherwise screened from public view.

Central Plant-Power Substation Exterior Wall

- If the University Village improvements of Birchknoll Drive and adjacent sidewalks affect the construction of the proposed utility facilities immediately north of Unity Drive and west of Birchknoll Drive, and/or if University Village utility arrangements include use of the proposed utility facility area, a decorative masonry wall should be constructed to visually screen and secure the area from public view and access. A minimum 10-foot wide landscaped area should separate the decorative wall from the back-of –sidewalk along Birchknoll Drive.

Cellular Antennas

- Free-standing cellular antennas are prohibited. Roof mounted cellular repeaters are permitted but should be concealed from public view when possible and otherwise integrated into surrounding building architecture.

Other Reference Documents

California State University., Office of the Chancellor. Guidance Document Post Construction, BMPs MUNICIPAL SEPARATE STORM SEWER SYSTEMS (MS4s) Phase II MS4 Permit. November 14, 2014.

Los Angeles County Department of Public Works, Design Division—Hydraulic Unit. “Exhibit 12: Los Angeles County Flood Control District QAllowable Letter.” (Daniel Munsterman, KPFF Consulting Engineers, Requester). Recorded October 6, 2016.

County Sanitation Districts of Los Angeles County. “Exhibit 13: Los Angeles County Sewer Maintenance District Will Serve Letter.” (“Will Serve Letter for California State University, Dominguez Hills Master Plan”). September 27, 2016. Ref. Doc. No. 3873563.

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