

IRRIGATION NOTES

- CONTRACTOR SHALL INSTALL IRRIGATION LINES, WIRES, VALVES AND HEADS PER SPECIFICATIONS. EXISTING GATE VALVES, POINT OF CONNECTION, ETC. ARE DERIVED FROM THE BEST AVAILABLE INFORMATION AND ON-SITE INSPECTION. THE CONTRACTOR SHALL VERIFY THOSE POINTS OF CONNECTION NOTED AND REPORT ANY DISCREPANCIES TO THE ENGINEER.
- THIS PLAN IS DIAGRAMMATIC. IRRIGATION SYSTEM IS SUBJECT TO FIELD ADJUSTMENTS DUE TO UNANTICIPATED SITE CONDITIONS. LOCATE ALL MAINLINES, LATERALS, VALVES AND SPRINKLER HEADS WITHIN PLANTING AREAS, UNLESS OTHERWISE NOTED. PLACE MAINLINE IN PLANTING AREAS WHERE NO SLEEVES ARE SHOWN. AVOID ANY CONFLICT BETWEEN UNDERGROUND UTILITIES, STRUCTURES AND PLANTINGS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING AND PROTECTING ALL EXISTING UTILITIES. BURY PRESSURE MAINLINES 18" AND LATERAL LINE 10" DEEP MINIMUM. HEADS SHALL NOT BE SPACED FURTHER THAN SHOWN ON THE DRAWINGS.
- THIS IRRIGATION SYSTEM WAS DESIGNED WITH A MINIMUM STATIC WATER PRESSURE OF 65 PSI AT THE POINT OF CONNECTION. NOTIFY THE PROJECT ENGINEER, IF WATER PRESSURE IS LESS THAN 65 PSI OR GREATER THAN 90 PSI.
- CONTRACTOR SHALL SECURE ALL NECESSARY PERMITS AND OBSERVE ALL LOCAL CODES AND REGULATIONS. THE CONTRACTOR SHALL CONFIRM ALL SITES DIMENSIONS AND CONDITIONS, AND REPORT ANY DISCREPANCIES TO THE ENGINEER.
- CONTRACTOR SHALL COORDINATE THE INSTALLATION OF ALL SLEEVES, CONDUITS, MAINLINES AND LATERALS UNDER PAVEMENT AND THROUGH WALLS. CONTRACTOR SHALL ASSURE THAT THESE ITEMS ARE LAID PRIOR TO PLACEMENT OF PAVEMENT OR WALL STRUCTURES.
- LOCATE AND INSTALL SPRINKLER HEADS 6" FROM SIDEWALKS, CURBS, DRIVEWAYS, BUILDING AND WALL UNLESS OTHERWISE NOTED. FLEX TUBING SHALL BE INSTALLED ON ALL SPRINKLER HEAD ALONG SIDEWALKS, DRIVEWAYS, AND PARKING SPACES. ADJUST ALL SPRINKLER HEADS AND FLOW CONTROL FOR MAXIMUM COVERAGE AND MINIMUM OVERTHROW AND MISTING. OPERATE ONLY ONE VALVE AT A TIME PER CONTROLLER.
- WITHIN 30 DAYS AFTER AWARD OF THE CONTRACT, SUBMIT FOR THE ENGINEER'S ACCEPTANCE SIX (6) COPIES OF DETAILED SCALED DRAWINGS AND WIRING DIAGRAMS FOR PERMANENT AND TEMPORARY IRRIGATION SYSTEMS. NOT PROPOSED DEVIATIONS FROM THE CONTRACT. INCLUDE SAMPLES OF MATERIALS, IF REQUIRED BY CONTRACT.
- PERFORM HYDROSTATIC TEST BY APPLYING CONTINUOUS STATIC PRESSURE OF 60 PSI FOR ONE (1) HOUR. NOTIFY THE ENGINEER AT LEAST THREE (3) DAYS IN ADVANCE OF TEST. REPAIR LEAKS THAT DEVELOP AND REPEAT TEST. DO NOT BACKFILL UNTIL THERE IS NO FURTHER SIGN OF LEAKAGE.
- PERFORM OPERABILITY TEST BY OPENING REMOTE CONTROL VALVE AND TEST CIRCUITS FOR LEAKS AROUND BARBED AND THREADED PVC FITTINGS. REPAIR LEAKS AND REPEAT TESTS. NOTIFY THE ENGINEER AT LEAST THREE (3) DAYS IN ADVANCE OF TEST. DO NOT BACKFILL UNTIL THERE IS NO FURTHER SIGN OF LEAKAGE.
- PERFORM COVERAGE TEST. BEFORE PLANTING PERIOD, RUN AUTOMATIC CONTROLLER THROUGH ALL IT'S CYCLES. CHECK WATERING FOR COVERAGES AND UNIFORMITY IN COMPANY OF THE ENGINEER. RUN SYSTEM UNTIL THERE ARE PUDDLES OR THERE IS SHEET FLOW TO DETERMINE INITIAL IRRIGATION TIME AND NUMBER OF CYCLES PER WEEK NEEDED TO WATER REQUIREMENTS OF PLANTS.
- LOCATE VALVE BOXES SO THAT THE OUTER EDGES ARE NO CLOSER THAN FIVE FEET TO ROADWAY PAVEMENT. GROUP VALVES BOXES AS FEASIBLE.
- IF PLANS DO NOT SPECIFY DEPTH OF EXCAVATION, PROVIDE MINIMUM COVER TO FINISH GRADE AS FOLLOWS:  
(A) 4 INCHES FOR DRIP IRRIGATION MAIN.  
(B) 18 INCHES FOR IRRIGATION MAIN.  
(C) 10 INCHES FOR IRRIGATION LATERAL.  
(D) 24 INCHES FOR SLEEVE OR CONDUIT UNDER LANDSCAPE PAVEMENT.  
(E) 36 INCHES FOR SLEEVE OR CONDUIT UNDER ROADWAY PAVEMENT.  
(F) FOR CONTROLLER WIRES AND CONDUITS IN UNPAVED AREAS, DEPTH EQUAL TO THAT OF PRESSURE IRRIGATION PIPE.
- IRRIGATION SYSTEMS SHALL BE OPERATED DURING "OFF PEAK" EVENING HOURS. OPERATION DURING OTHER TIMES SHALL BE WITH THE APPROVAL OF THE ARCHITECT.

NON POTABLE IRRIGATION NOTES

- THE RECLAIMED WATER IRRIGATION SYSTEM SHALL CONFORM TO ALL REQUIREMENTS OF "GUIDELINES FOR THE TREATMENT AND USE OF RECLAIMED WATER" BY THE DEPARTMENT OF HEALTH, STATE OF HAWAII, DATED MAY 15, 2002.
- ALL NEW BURIED IRRIGATION PIPING IN THE RECLAIMED WATER SYSTEM, INCLUDING SERVICE LINES, VALVES, AND OTHER APPURTENANCES SHALL BOTH BE COLORED PURPLE, SUGGESTED COLOR PANTONE 512 OR EQUAL, AND EMBOSSED OR TO BE INTEGRALLY STAMPED/MARKED "RECLAIMED WATER - DO NOT DRINK", OR BE INSTALLED WITH PURPLE IDENTIFICATION TAPE, OR PURPLE POLYETHYLENE WRAP, SUGGESTED COLOR PANTONE 512 OR EQUAL.
- VALVE BOXES SHALL BE STANDARD CONCRETE OR FIBERGLASS BOX CONFORMING WITH "WATER SYSTEM STANDARDS" VOLUME 1, STATE OF HAWAII, 1985. ALL VALVE COVERS ON RECLAIMED WATER LINES SHALL CONTAIN "RECLAIMED WATER" INSCRIPTIONS ON THE TOP SURFACE.
- NOTIFICATION SIGNS INDICATING THAT RECLAIMED WATER IS BEING UTILIZED FOR LANDSCAPE IRRIGATION SHALL BE POSTED AT CONSPICUOUS LOCATIONS THROUGHOUT THE PROJECT. THE SIGNS SHALL INDICATE BOTH IN WRITING AND PICTORIALY THAT RECLAIMED WATER IS NOT SUITABLE FOR DRINKING. THE LOCATION OF THE SIGNS SHALL BE NOTED ON THE IRRIGATION SYSTEM DESIGN PLANS.
- BEFORE CONSTRUCTION OF THE IRRIGATION SYSTEM COMMENCES, THE STATE DEPARTMENT OF HEALTH MUST APPROVE THE RECLAIMED WATER IRRIGATION SYSTEM DESIGN.
- ENGINEER HAS THE RIGHT TO STOP CONSTRUCTION SHOULD ANY WORK BE FOUND CONTRARY TO THE APPROVED PLANS AND SPECIFICATIONS, DEPARTMENT OF HEALTH RECLAIMED WATER RULES, OR DETRIMENTAL TO PUBLIC INTEREST.
- PRIOR TO STARTUP OF THE IRRIGATION SYSTEM, REPRESENTATIVES OF THE STATE DEPARTMENT OF HEALTH SHALL INSPECT THE RECLAIMED WATER IRRIGATION SYSTEM ALONG WITH THE IRRIGATION SYSTEM CONTRACTOR AND ENGINEER. ONCE THE IRRIGATION SYSTEM PASSES INSPECTION, PERMITS FOR RECLAIMED WATER USE SHALL BE ISSUED TO THE ENGINEER.

IRRIGATION LIST AND LEGEND

IRRIGATION EQUIPMENT SHALL BE AS NOTED, SUBJECT TO PRE-QUALIFIED ACCEPTABLE SUBSTITUTES AS GOVERNED BY THE SPECIFICATIONS.

SYMBOL	DESCRIPTION	IRRIGATION HEADS	GPM/PSI	RADIUS	ARC
----	PVC SCH. 40 MAIN (PRESSURE) LINE, 2-1/2" AND SMALLER, OR PVC CLASS 200 MAIN (PRESSURE) LINE, 3" AND LARGER	4" POP-UP SPRAY HEAD WITH INTEGRAL CHECK VALVE AND PRESSURE REGULATION: RAINBIRD 1804-SAM-PRS-15 SERIES, TORO 510Z-4P-PRX-COM-15 SERIES, OR HUNTER INST-04-CV-15 SERIES			
-----	PVC CLASS 200 LATERAL (NON-PRESSURE) LINE. SIZES AS NOTED.	4" POP-UP SPRAY	0.92-30	15'	QUAR.
=====	PVC SCH. 40 PIPE SLEEVE. 2" MIN. SIZE.	4" POP-UP SPRAY	1.23-30	15'	120'
-----	PVC SCH. 40 WIRE CONDUIT. 2" SIZE.	4" POP-UP SPRAY	1.85-30	15'	HALF
W	GATE VALVE, 3" SIZE OR LESS, AMERICAN MADE CLASS 125 CAST BRONZE, WITH THREADED CONNECTIONS AND NON-RISING STEM, LINE SIZED.	4" POP-UP SPRAY	2.18-30	15'	210'
—	MANUAL ANGLE VALVE, AMERICAN MADE CLASS 125 CAST BRONZE, WITH THREADED CONNECTIONS, LINE SIZED.	4" POP-UP SPRAY	3.10-30	15'	FULL
Ⓢ	DWS, COUNTY OF HAWAII APPROVED REDUCED PRESSURE PRINCIPLE BACKFLOW PREVENTION DEVICE. 2-1/2" SIZE: WATTS 309 SERIES, FEBCO 825Y SERIES, OR CLA-VAL RP-1 SERIES	4" POP-UP SPRAY HEAD WITH INTEGRAL CHECK VALVE AND PRESSURE REGULATION: RAINBIRD 1804-SAM-PRS-8-STRIP SERIES, TORO 510Z-4P-PRX-COM-4-X8T SERIES, OR HUNTER INST-04-CV-STRIP SERIES			
Ⓢ	CONTROL VALVE ASSEMBLY: BRASS BALL VALVE, FULL PORT, WITH STEEL LEVER HANDLE AND FEMALE THREADED INLETS.	4" POP-UP SPRAY	0.61-30	4'X15'	END STRIP
Ⓢ	BRASS REMOTE CONTROL VALVE, 200 PSI MIN, SIZES AS NOTED: RAINBIRD GB SERIES, TORO 220 SERIES, OR HUNTER HBV SERIES	4" POP-UP SPRAY	121-30	4'X30'	SIDE STRIP
Ⓢ	DRIP VALVE ASSEMBLY: 3/4" PVC BALL VALVE: RAINBIRD XBV-015	4" POP-UP LOW ANGLE (15' MAX. TRAJECTORY) SPRAY HEAD WITH INTEGRAL CHECK VALVE AND PRESSURE REGULATION: RAINBIRD 1804-SAM-PRS-10 SERIES, TORO 510Z-4P-PRX-COM-10 SERIES, OR HUNTER INST-04-CV-10 SERIES			
Ⓢ	200 MESH (75 MICRON) WYE FILTER: RAINBIRD RBY-015-200MX	4" POP-UP LOW ANGLE SPRAY	0.39-30	10'	QUAR.
Ⓢ	LOW FLOW, 0.2-22 GPM, REMOTE CONTROL VALVE: RAINBIRD 15-DVX	4" POP-UP LOW ANGLE SPRAY	0.52-30	10'	120'
Ⓢ	PRE-SET 30 PSI OUTLET IN-LINE PRESSURE REGULATOR: RAINBIRD PSI-L30X-015	4" POP-UP LOW ANGLE SPRAY	0.79-30	10'	HALF
Ⓢ	QUICK COUPLING VALVE, 2 PIECE WITH LOCKING VINYL OR RUBBER COVER, 1" SIZE: RAINBIRD 44LRC, TORO 414-24, OR BUCKNER QB44LRC10	4" POP-UP LOW ANGLE SPRAY	1.51-30	10'	FULL
Ⓢ	IRRIGATION CONTROLLER, SOLID STATE, 4 PROGRAM MINIMUM, CONTROLLER 'A' 40 STATIONS MINIMUM, CONTROLLER 'B' 40 STATIONS MINIMUM: RAINBIRD ESP-XXMC SERIES, TORO CC-M-XX SERIES, OR HUNTER ICC-XX00M SERIES	4" POP-UP ADJUSTABLE ARC (23" MAX. TRAJECTORY) SPRAY HEAD W/INTEGRAL CHECK VALVE: RAINBIRD 1804-SAM-10-VAN SERIES			
—	CONDUIT MOUNTED AUTOMATIC RAIN SHUT-OFF SENSOR: RAINBIRD RSC-CEX, HUNTER MINI-CLIC-C, OR TORO RAIN SWITCH	4" POP-UP ADJ. ARC SPRAY	VARIES-30	15'	ADJ.
—	STAINLESS STEEL CONTROLLER ENCLOSURE: STRONGBOX 3B-1888, OR LEMEUR SAFEGUARD 4 JR.	4" POP-UP ADJUSTABLE ARC LOW ANGLE (10" MAX. TRAJECTORY) SPRAY HEAD W/INTEGRAL CHECK VALVE: RAINBIRD 1804-SAM-10-VAN SERIES			
—	PROVIDE THE FOLLOWING EQUIPMENT FOR THE OWNER'S USE:	4" POP-UP ADJ. ARC LOW ANGLE SPRAY	VARIES-30	10'	ADJ.
—	LOCK TOP KEY FOR QUICK COUPLING VALVE. MATCH QUICK COUPLING VALVE MANUFACTURER (PROVIDE 2 TOTAL)	ADJUSTABLE FLOOD BUBBLER ON 4" RISER: RAINBIRD B00A-F OR TORO 510SR-514-20			
—	COUPLER KEY, WITH 1" MALE PIPE THREAD OUTLET. MATCH QUICK COUPLER MANUFACTURER (PROVIDE 2 TOTAL)	ADJUSTABLE FLOOD BUBBLER	1.70-30		FLOOD
—	HOSE SWIVEL ELL. WITH 1" FEMALE PIPE THREAD INLET AND 1" MALE HOSE THREAD OUTLET (PROVIDE 2 TOTAL)	4" POP-UP STREAM BUBBLER: HUNTER INST-04-CV-M5BN-10F OR TORO 510Z-4P-PRX-COM-8B-360-PC2			
—	1" X 50' HEAVY DUTY (COMMERCIAL GRADE) NON-KINK REINFORCED RUBBER HOSE (PROVIDE 2 TOTAL)	4" POP-UP STREAM BUBBLER	1.0-30		FLOOD
—	CONTROLLER/VALVE NO.	3" MIN. POP-UP, (25" MAX. TRAJECTORY), GEAR DRIVEN, ADJUSTABLE ARC AND RADIUS, SINGLE STREAM ROTOR W/INTEGRAL CHECK VALVE: HUNTER I-25-XXV-XX SERIES OR TORO 5100P-XC-XX-SA SERIES			
—	VALVE SIZE	POP-UP STREAM ROTOR	3.20-40	40'	QUAR.
—	GPM (OR GPH) THROUGH VALVE	POP-UP STREAM ROTOR	6.60-40	45'	HALF
—	LINE SIZE	POP-UP STREAM ROTOR	6.60-40	45'	FULL
—	SLEEVE SIZE	3" MIN. POP-UP, LOW ANGLE (15" MAX. TRAJECTORY), GEAR DRIVEN, ADJUSTABLE ARC AND RADIUS, SINGLE STREAM ROTOR W/INTEGRAL CHECK VALVE: HUNTER I-25-XXV-XX SERIES OR TORO 5100P-XC-XX-SA SERIES			
—		POP-UP STREAM ROTOR	1.90-40	27'	QUAR.
—		POP-UP STREAM ROTOR	2.50-40	30'	HALF
—		POP-UP STREAM ROTOR	2.50-40	30'	FULL
—		UV RESISTANT POLYETHYLENE TUBING, WITH (3) PRESSURE COMPENSATING EMITTERS PER SHRUB: RAINBIRD XERI-BUG EMITTER XB-20PC			
—		POLY TUBING WITH EMITTERS	6.0	GPH PER SHRUB	



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STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

LANDSCAPE IRRIGATION LEGEND AND NOTES

QUEEN KAAHUMANU HIGHWAY WIDENING  
HENRY ST. to KEALAKEHE PKWY - PHASE I

Federal Aid Project No. NH-019-1(20)

Date: November 2009

SHEET No. L-1 OF 17 SHEETS

AS-BUILT

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-1(20)	2005	236	315

PLANT LIST

QUANTITY		BOTANICAL NAME	COMMON NAME	ROOTBALL	HEIGHT	SPREAD	CALIFER
TREES							
38 EA.		CASSIA NEALIAE	RAINBOW SHOWER	25 GAL	8'	5'	2"
20 EA.		SAMANEA SAMAN	MONKEYPOD	25 GAL	8'	5'	2"
PALMS							
14 EA		FRITCHARDIA SPP.	LOULU PALM	65 GAL	4'-6'	BROWN TRUNK	
SHRUBS							
64 EA		BOUGAINVILLEA 'MISS MANILA'	MISS MANILA BOUGAINVILLEA	1 GAL	12"	12"	18"
2,950 SF.		MYOPORUM SANDWICENSE VAR 'PAPA'	NAIO PAPA	1 GAL	12"	12"	18"
434 EA		BOUGAINVILLEA 'MARY PALMER'	MARY PALMER BOUGAINVILLEA	1 GAL	12"	12"	18"
VINES							
48 EA		FRYOSTEGIA VENUSTA	FLAME VINE	3 GAL	12"	24"	--
GRASS							
188,110 SF.		CYNODON DACTYLON	COMMON BERMUDA GRASS	SEED	--	--	--
340 L.F.	RB	PROVIDE AND INSTALL ROOT BARRIER FOR ALL AS INDICATED ON THE DRAWINGS. ROOT BARRIERS SHALL BE HERBICIDE IMPREGNATED GEOTEXTILE FABRIC, SUCH AS TYFAR BIOBARRIER, OR A PRE-QUALIFIED ACCEPTABLE SUBSTITUTE.					
200 L.F.	AE	ALUMINUM EDGING WITH STAKES AND SPLICERS					

PLANTING NOTES

1. LANDSCAPE CONTRACTOR SHALL FIELD VERIFY ALL PLANT QUANTITIES AND DIMENSIONS PRIOR TO INSTALLATION. QUANTITIES SHOWN ON PLANT LIST ARE FOR REFERENCE ONLY, VERIFY ACTUAL QUANTITIES AS SHOWN ON PLAN. IF THERE IS A DISCREPANCY, THE PLANTING PLAN SHALL TAKE PRECEDENCE.
2. LANDSCAPE CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING AND PROTECTING EXISTING UTILITIES.
3. PRIOR TO TREE AND SHRUB HOLE EXCAVATION, ALL PLANTING LOCATIONS SHALL BE STAKED OUT BY CONTRACTOR FOR APPROVAL BY ENGINEER. DO NOT PLANT UNTIL GROUND HAS BEEN PREPARED AND FREE OF STONES GREATER THAN 1/2", DIA, SITE IS NEAT, ORDERLY, AND THE ENGINEER ACCEPTS SITE FOR PLANTING.
4. NOTIFY ENGINEER OF ANY DISCREPANCIES IN PLANT LOCATIONS OR INSUFFICIENT PLANT QUANTITIES DUE TO DIFFERENCE IN PLANS AND ACTUAL FIELD CONDITIONS.
5. NOTIFY ENGINEER 30 DAYS PRIOR TO PLANTING OPERATIONS FOR APPROVAL OF ALL PLANT MATERIAL AT PLACE OF GROWTH. ALL PLANT MATERIAL NOT APPROVED BY THE ENGINEER WILL BE SUBJECT TO REJECTION.
6. THE ENGINEER WILL INSPECT PLANTS AT THE PLACE OF GROWTH AFTER THE DELIVERY TO THE PROJECT. EACH TREE SHALL BE TAGGED BY THE ENGINEER WITH A CONSECUTIVELY NUMBERED PLASTIC TAMPER-RESISTANT AND SELF-LOCKING SEAL. SEALS SHALL REMAIN ON TREES AND ONLY BE REMOVED BY THE ENGINEER AT THE COMPLETION OF THE PLANT ESTABLISHMENT PERIOD. TREES DELIVERED TO THE PROJECT WITHOUT ENGINEER'S SEAL WILL BE REJECTED.
7. PLANTS SHALL MEET SIZE INDICATED BY MINIMUM HEIGHT AND SPREAD. PLANTS SHALL BE STRAIGHT AND UNIFORMLY SHAPED, UNLESS UNIQUE OR SPECIAL CHARACTERISTICS ARE SPECIFIED, AND SHALL BE UNDAMAGED, SOUND, HEALTHY, VIGOROUS AND FREE OF DISEASE AND INSECT INFESTATION. PLANTS NOT CONFORMING TO THESE REQUIREMENTS ON DELIVERY TO THE PROJECT AND AT THE END OF THE PLANT ESTABLISHMENT PERIOD WILL BE REJECTED.
8. CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR THE COMPLETE REMOVAL AND DAMAGES RESULTING FROM PLANTING ANY SPECIES LISTED ON THE HAWAII DEPARTMENT OF AGRICULTURE 'NOXIOUS WEED RULES' AS DEFINED IN THE STATUTE, HAWAII ADMINISTRATIVE RULES 4.68.1 OR THE FEDERAL NOXIOUS WEED LIST' AS DEFINED IN TITLE 7 OF THE CODE OF FEDERAL REGULATIONS (CFR), PARTS 360 AND 361.
9. ALL TREE WORK MUST ADHERE TO AMERICAN NATIONAL STANDARD INSTITUTE (OR ANSI) - A300 TREE CARE STANDARDS AND ANSI - Z133 SAFETY STANDARDS FOR TREE WORK. WORK SHALL BE CONTRACTED TO ARBORISTS THAT HAS BEEN CERTIFIED IN GOOD STANDINGS AS AN ISA CERTIFIED ARBORISTS FOR AT LEAST 5 YEARS TO ASSURE THAT TREE WORK IS PERFORMED PROPERLY AND TREES ARE NOT DAMAGED BY PRACTICES SUCH AS TOPPING, FLUSH CUTS, OVER-THINNING, OR CLIMBING WITH SPIKES. CONTRACTOR SHALL SUBMIT A COPY OF THE ISA ARBORIST CERTIFICATION OF GOOD STANDING OF 5 YEARS TO THE ENGINEER MINIMUM 1 DAYS PRIOR TO TREE PRUNING.
10. FOR THE DURATION OF CONSTRUCTION WITHIN THE DRIP LINE OF TREES TO REMAIN THERE MUST BE: NO CHANGES, ALTERATIONS OR DISTURBANCE TO THE GRADE BY ADDING FILL, EXCAVATING OR SCRAPING EXCEPT AS NOTED ON PLANS, NO STORAGE OF CONSTRUCTION MATERIAL OR EQUIPMENT, NO STOCKPILING OF ANY CONSTRUCTION MATERIAL OR ANY EXCAVATED MATERIAL, NO DISPOSAL OF ANY LIQUIDS (E.G. CONCRETE BLETH, GAS, OIL, PAINT), NO VEHICULAR TRAFFIC, EQUIPMENT OR EXCESSIVE PEDESTRIAN TRAFFIC, NO ATTACHMENT OF ANY WIRES, ROPES, LIGHTS, OR ANY OTHER SUCH ATTACHMENT OTHER THAN THOSE OF PROTECTIVE NATURE TO ANY TREE TO BE PRESERVED, AND NO CLEANING OF EQUIPMENT OR MATERIAL UNDER THE CANOPY OF ANY TREE OR GROUP OF TREES TO REMAIN.
11. PROTECTIVE FENCE SHALL BE ERECTED AROUND TREES IDENTIFIED ON PLAN OR TREES WITH TRUNK DIAMETER GREATER THAN 24 INCHES AS MEASURED AT HEIGHT OF 4-1/2 FEET. PROTECTIVE FENCE SHALL BE 4 FEET HIGH ORANGE PLASTIC MESH OR APPROVED EQUIVALENT SUPPORTED ON STEEL T-POST A MINIMUM OF 6 FEET LONG. PROTECTIVE FENCE SHALL SURROUND TREE AT MINIMUM OF 10 FEET FROM TREE TRUNK STEEL T-POST AT A MINIMUM OF 5 FEET ON CENTER.
12. IF TREES OTHER THAN THOSE SPECIFICALLY DESIGNATED FOR REMOVAL ARE DAMAGED BEYOND SURVIVAL CONDITIONS AS DETERMINED BY ENGINEER, THE CONTRACTOR SHALL REMOVE SUCH TREES AND REPLACE THE TREE WITH A SAME SPECIE AND SIZE AND MAINTAIN FOR THE DURATION OF CONSTRUCTION OR 12 MONTHS WHICHEVER IS GREATER AT NO COST TO THE STATE.
13. PROVIDE EVEN FOUR-INCH LAYER OF PLANTING SOIL OVER ALL PLANTING AREAS. REPRESENTATIVE SAMPLES OF SOIL FROM PROJECT SITE SHALL BE SUBMITTED TO THE UNIVERSITY OF HAWAII AGRICULTURAL EXTENTION SERVICE OR LABORATORY ACCEPTABLE TO THE ENGINEER FOR ANALYSIS OF REQUIRED SOIL AMENDMENTS. TEST RESULTS AND FERTILIZATION SCHEDULE SHALL BE PRESENTED TO THE ENGINEER FOR REVIEW AND ACCEPTANCE BEFORE PLACING PLANTING SOIL. UNIFORMLY DISTRIBUTE FERTILIZER AND AMENDMENTS OVER PLANTING AREAS AS RECOMMENDED BY THE SOIL ANALYSIS REPORT. ROTOTILL TOP FOUR-INCHES OF SOIL TO EVENLY INCORPORATE FERTILIZER AND AMENDMENTS.

14. GUY WIRES, FLAGGING, STAKES, WINDBREAKERS, ETC. SHALL BE MAINTAINED AND REPLACED IF NECESSARY BY THE CONTRACTOR UNTIL THE TREE OR SHRUB IS ABLE TO STAND BY ITSELF. THE CONTRACTOR SHALL REMOVE AND DISPOSE AT THE END OF PLANT ESTABLISHMENT PERIOD.
15. ANY PLANTING THAT OBSTRUCTS SIGHT DISTANCE, SIGNS OR TRAFFIC LIGHTS SHALL BE RELOCATED OR REMOVED AS DETERMINED BY THE ENGINEER.
16. IN INSTANCES WHERE IRRIGATION SYSTEMS ARE NOT INSTALLED, THE CONTRACTOR SHALL PROVIDE TEMPORARY IRRIGATION AS REQUIRED FOR THE ESTABLISHMENT OF PLANT MATERIALS FOR THE DURATION OF THE PLANT MAINTENANCE PERIOD. TEMPORARY IRRIGATION SHALL REMAIN THE PROPERTY OF THE CONTRACTOR AND SHALL BE REMOVED UPON PROJECT COMPLETION. TYPE AND MEANS OF TEMPORARY IRRIGATION SHALL BE AT THE OPTION OF THE CONTRACTOR.



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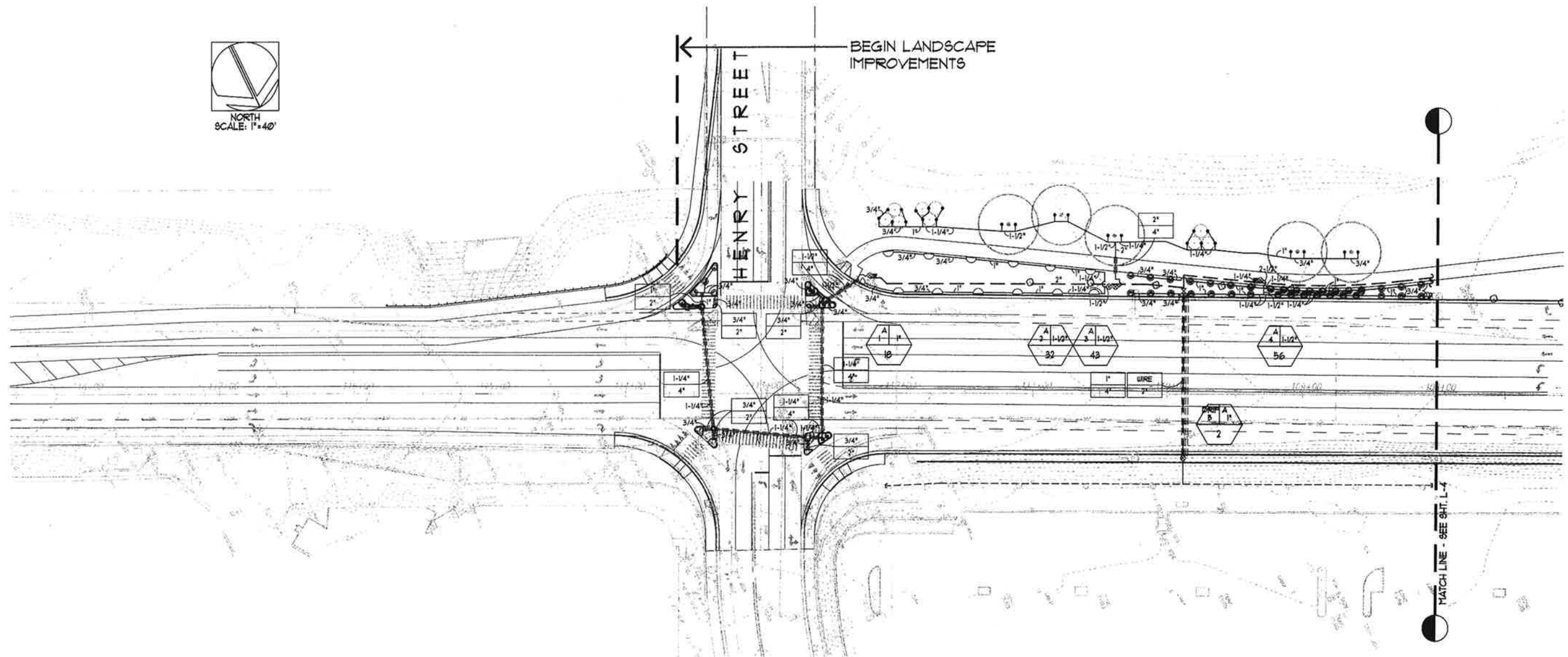
LANDSCAPE PLANTING LIST AND NOTES

QUEEN KAAHUMANU HIGHWAY WIDENING  
HENRY ST. to KEALAKEHE PKWY - PHASE I

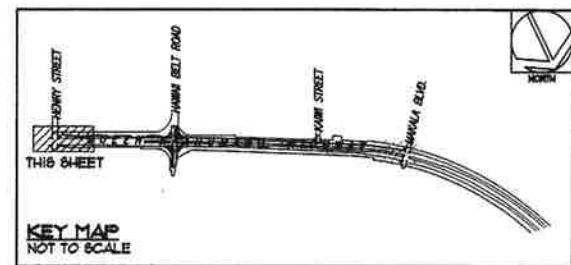
Federal Aid Project No. NH-019-1(20)

Date: November 2009

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-1(20)	2005	237	315



LANDSCAPE IRRIGATION PLAN - 1  
SCALE: 1"=40'



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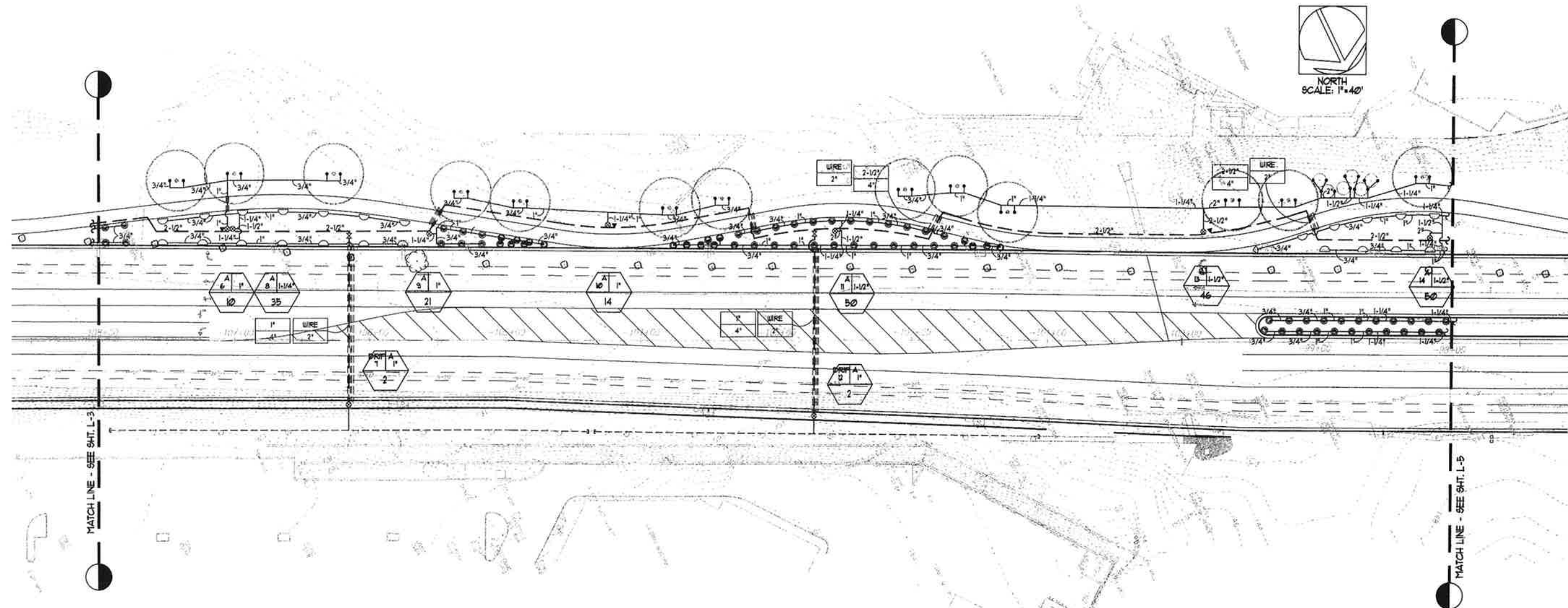
LANDSCAPE IRRIGATION PLAN - 1

**QUEEN KAAHUMANU HIGHWAY WIDENING  
HENRY ST. to KEALAKEHE PKWY - PHASE I**

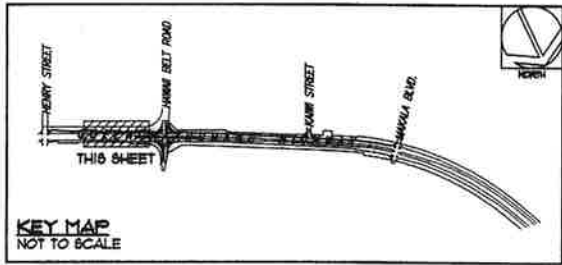
Federal Aid Project No. NH-019-1(20)  
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SHEET No. L-3 OF 17 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
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LANDSCAPE IRRIGATION PLAN - 2  
SCALE: 1"=40'



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LANDSCAPE IRRIGATION PLAN - 2

**QUEEN KAAHUMANU HIGHWAY WIDENING  
HENRY ST. to KEALAKEHE PKWY - PHASE I**

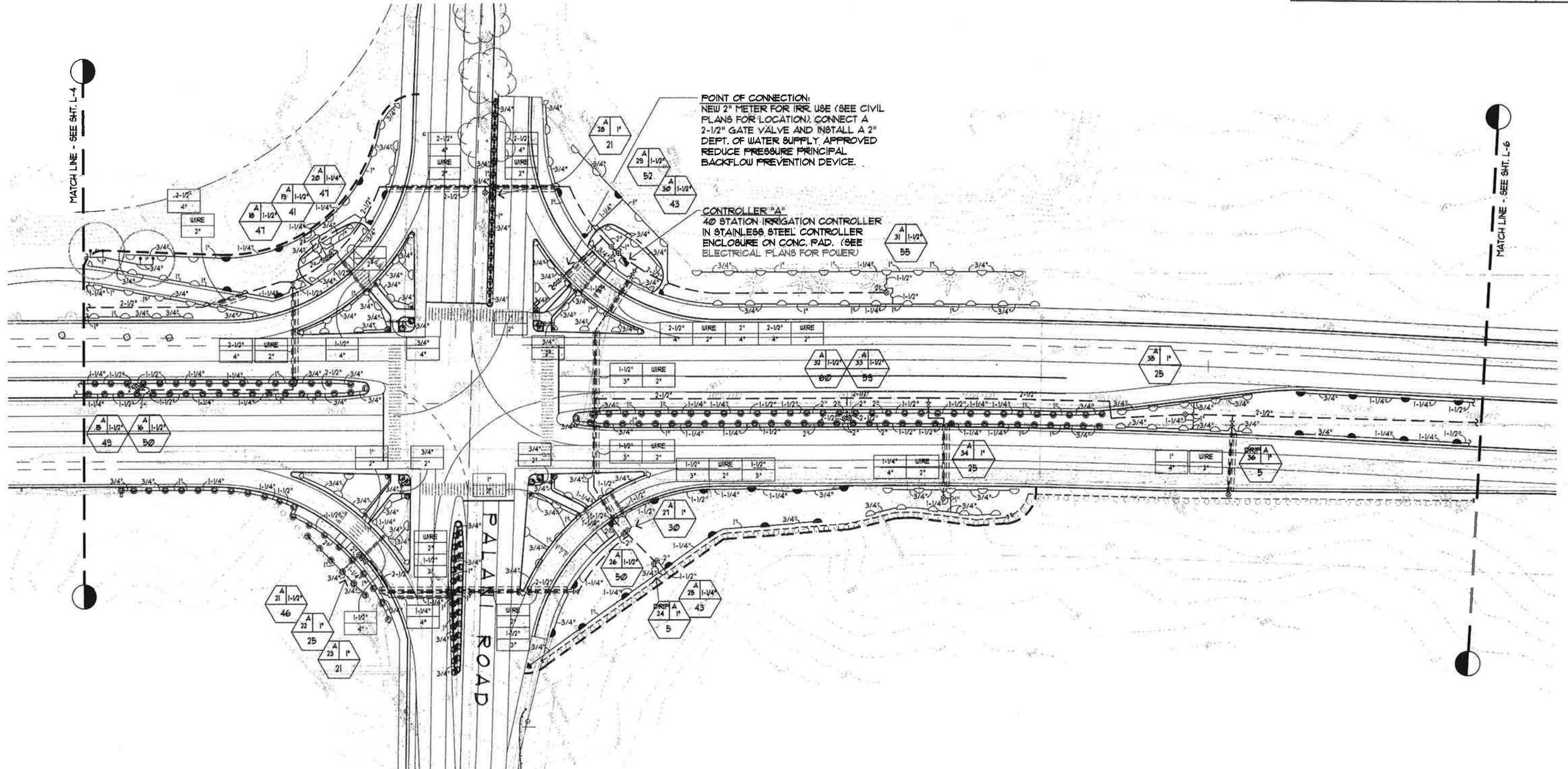
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Date: November 2009

SHEET No. L-4 OF 17 SHEETS

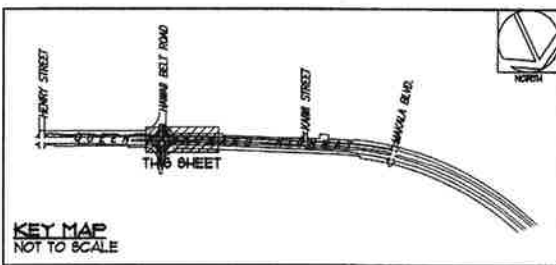
AS-BUILT



FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-1(20)	2005	239	315



LANDSCAPE IRRIGATION PLAN - 3  
SCALE: 1"=40'



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LANDSCAPE IRRIGATION PLAN - 3  
  
**QUEEN KAAHUMANU HIGHWAY WIDENING  
HENRY ST. to KEALAKEHE PKWY - PHASE I**  
  
Federal Aid Project No. NH-019-1(20)  
Date: November 2009

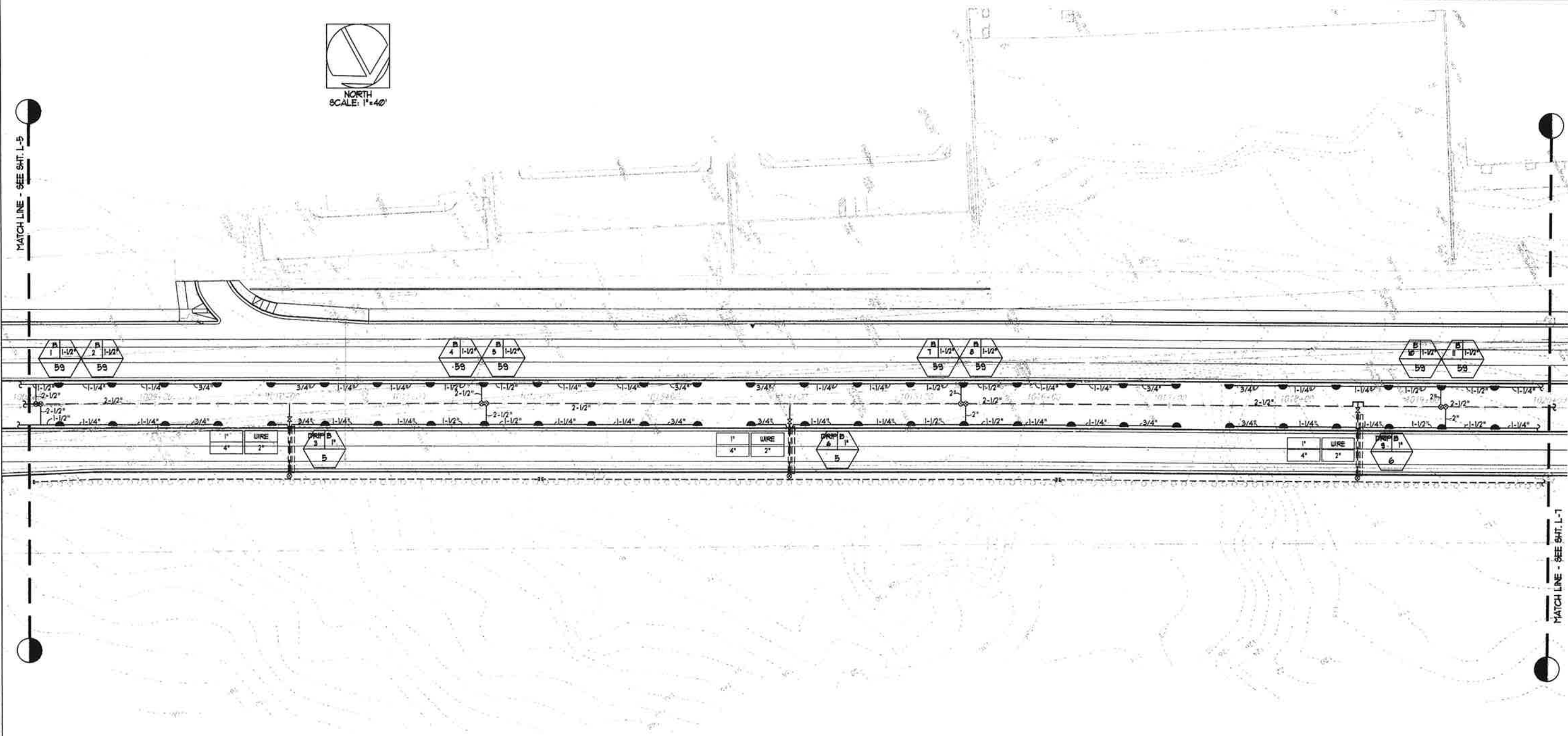
AS-BUILT

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-1(20)	2005	240	315

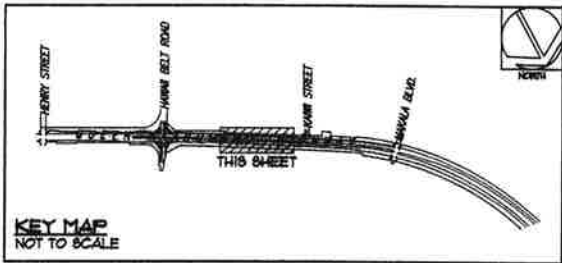


MATCH LINE - SEE SHT. L-5

MATCH LINE - SEE SHT. L-7



LANDSCAPE IRRIGATION PLAN - 4  
SCALE: 1"=40'

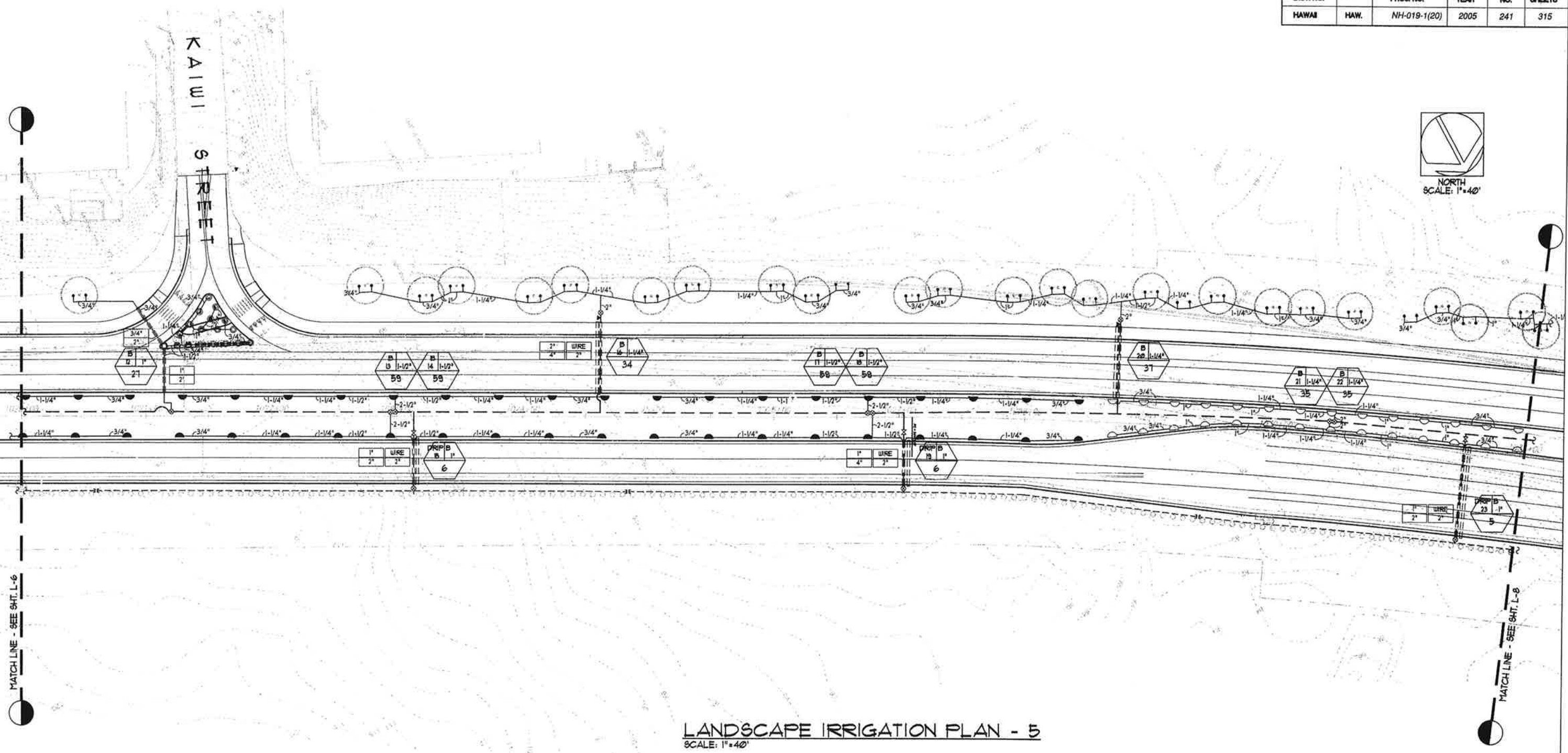


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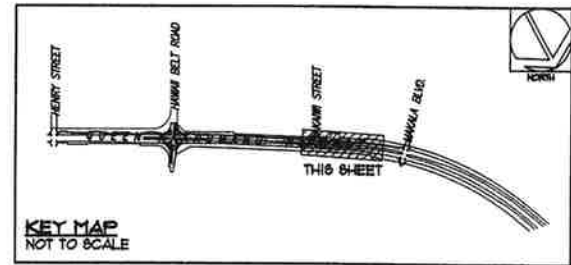
STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

LANDSCAPE IRRIGATION PLAN - 4  
  
**QUEEN KAAHUMANU HIGHWAY WIDENING**  
**HENRY ST. to KEALAKEHE PKWY - PHASE I**  
Federal Aid Project No. NH-019-1(20)  
Date: November 2009

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-1(20)	2005	241	315



LANDSCAPE IRRIGATION PLAN - 5  
SCALE: 1"=40'



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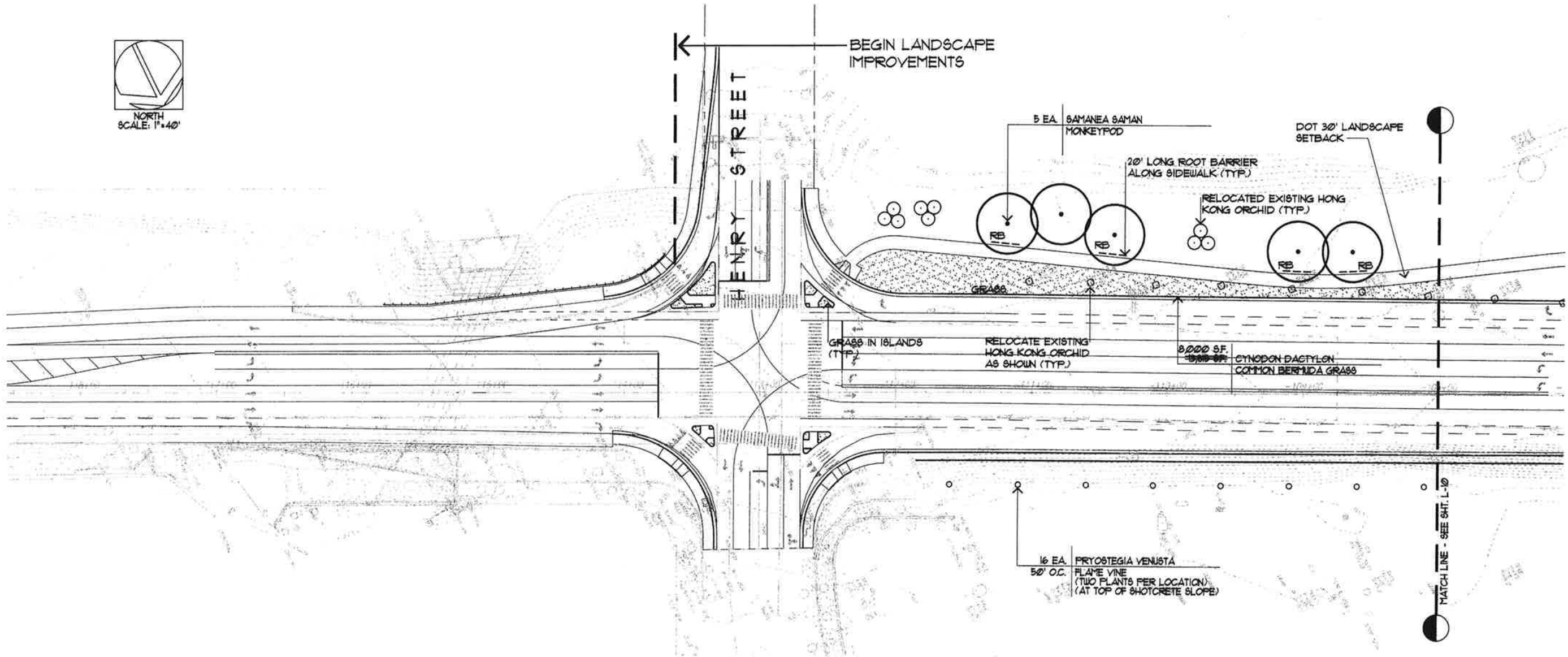
STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION  
  
LANDSCAPE IRRIGATION PLAN - 5  
  
QUEEN KAAHUMANU HIGHWAY WIDENING  
HENRY ST. to KEALAKEHE PKWY - PHASE I  
Federal Aid Project No. NH-019-1(20)  
Date: November 2009



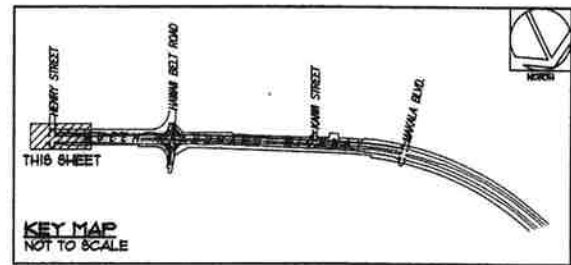




FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-1(20)	2005	243	315



LANDSCAPE PLANTING PLAN - 1  
SCALE: 1"=40'



MICHAEL T. MIYABARA  
LICENSED PROFESSIONAL LANDSCAPE ARCHITECT  
No. 4237  
HAWAII, U.S.A.

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Miyabara Associates LLC

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

LANDSCAPE PLANTING PLAN - 1

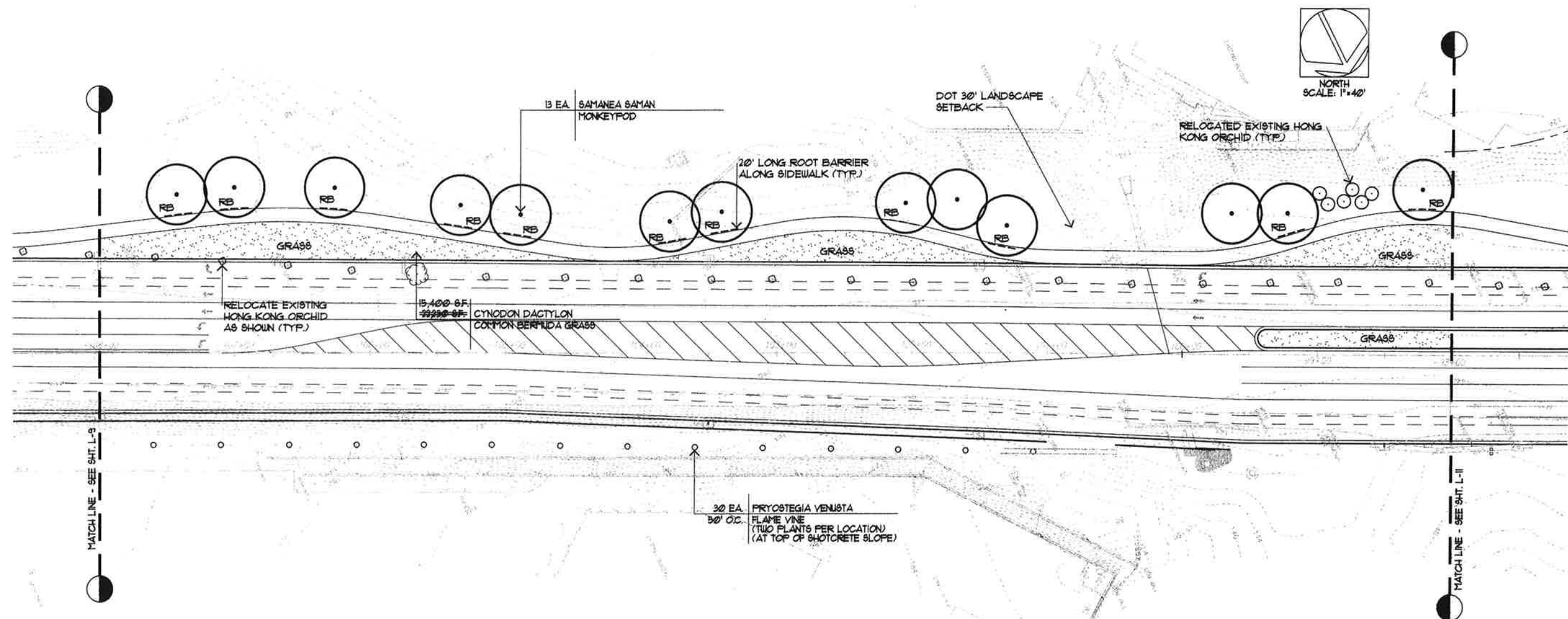
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HENRY ST. to KEALAKEHE PKWY - PHASE I

Federal Aid Project No. NH-019-1(20)  
Date: November 2009

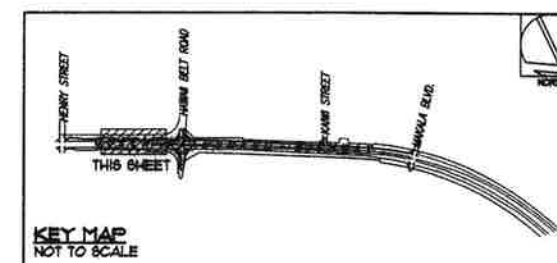
SHEET No. L-9 OF 17 SHEETS

AS-BUILT

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-1(20)	2005	244	315



LANDSCAPE PLANTING PLAN - 2  
SCALE: 1"=40'



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STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

LANDSCAPE PLANTING PLAN - 2

**QUEEN KAAHUMANU HIGHWAY WIDENING  
HENRY ST. to KEALAKEHE PKWY - PHASE I**

Federal Aid Project No. NH-019-1(20)  
Date: November 2009

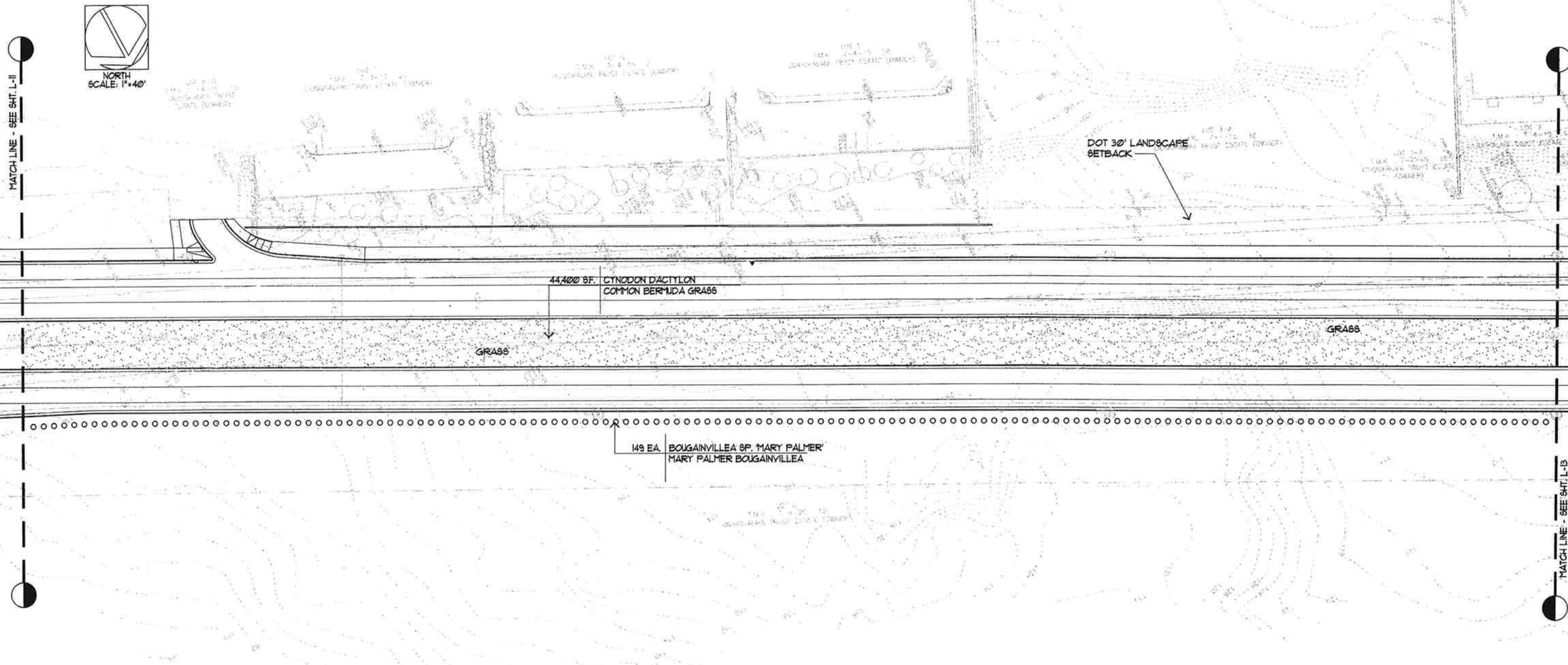
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AS-BUILT

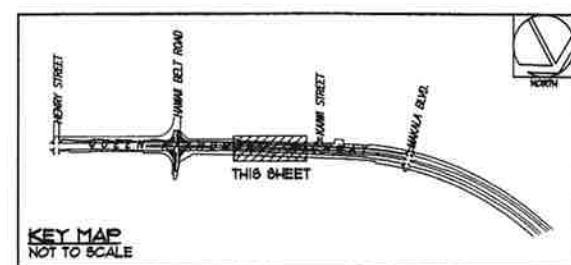




FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-1(20)	2005	246	315



LANDSCAPE PLANTING PLAN - 4  
SCALE: 1"=40'



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HAWAII, U.S.A.

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HIGHWAYS DIVISION

LANDSCAPE PLANTING PLAN - 4

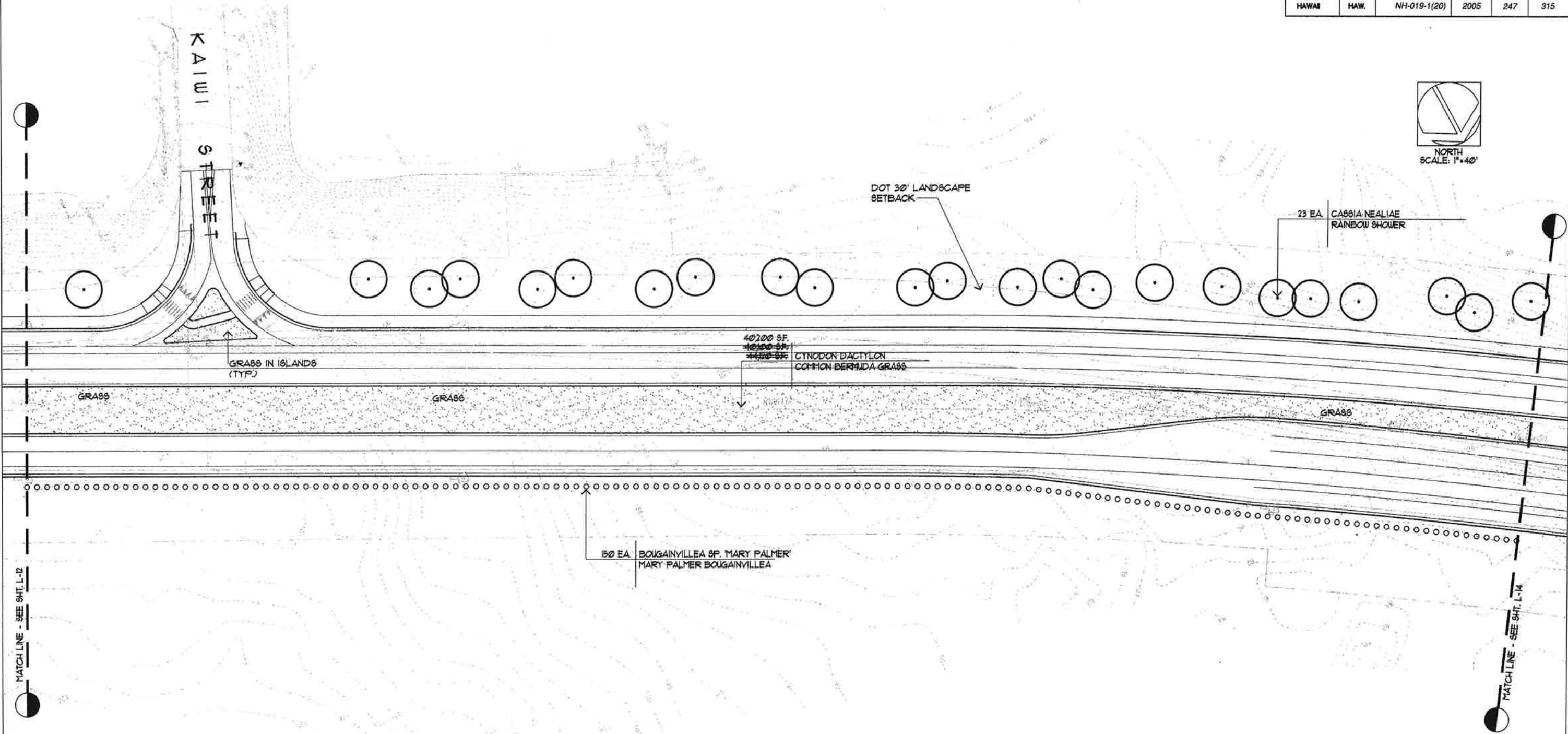
QUEEN KAAHUMANU HIGHWAY WIDENING  
HENRY ST. to KEALAKEHE PKWY - PHASE I

Federal Aid Project No. NH-019-1(20)  
Date: November 2009

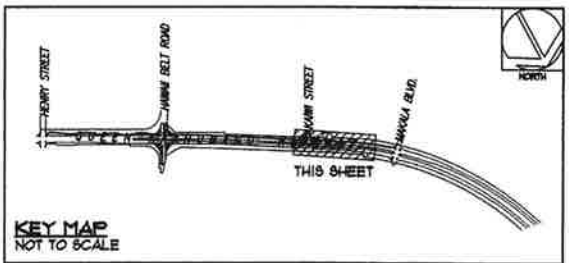
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AS-BUILT

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-1(20)	2005	247	315



LANDSCAPE PLANTING PLAN - 5  
SCALE: 1"=40'



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STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

LANDSCAPE PLANTING PLAN - 6

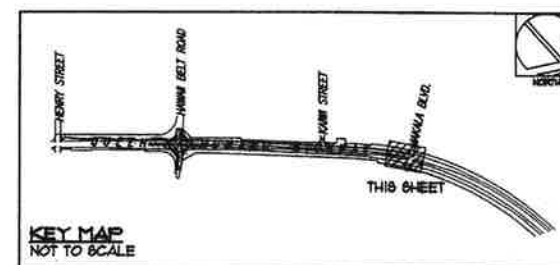
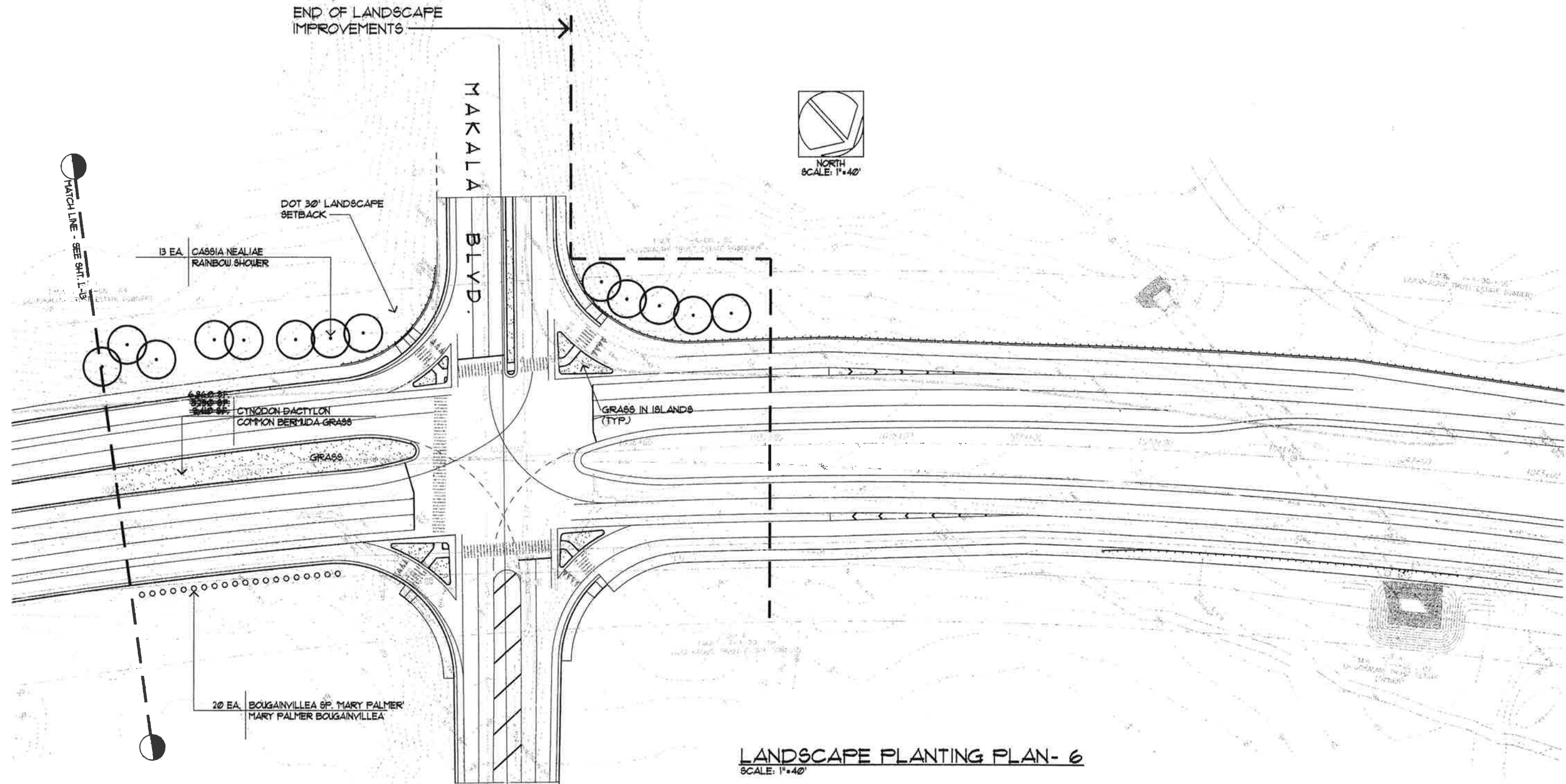
QUEEN KAAHUMANU HIGHWAY WIDENING  
HENRY ST. to KEALAKEHE PKWY - PHASE I

Federal Aid Project No. NH-019-1(20)  
Date: November 2009

SHEET No. L-13 OF 17 SHEETS

AS-BUILT

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-1(20)	2005	248	315



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STATE OF HAWAII  
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HIGHWAYS DIVISION

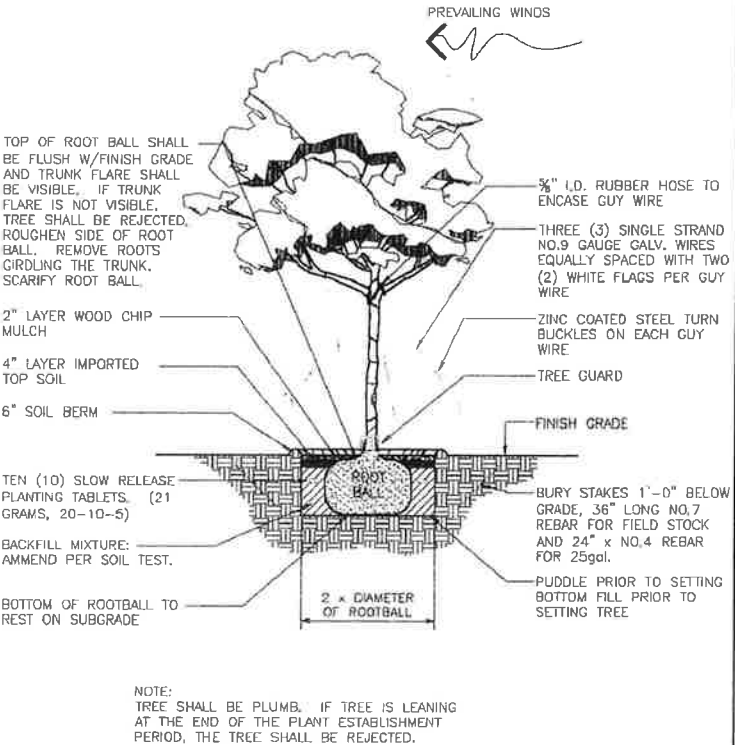
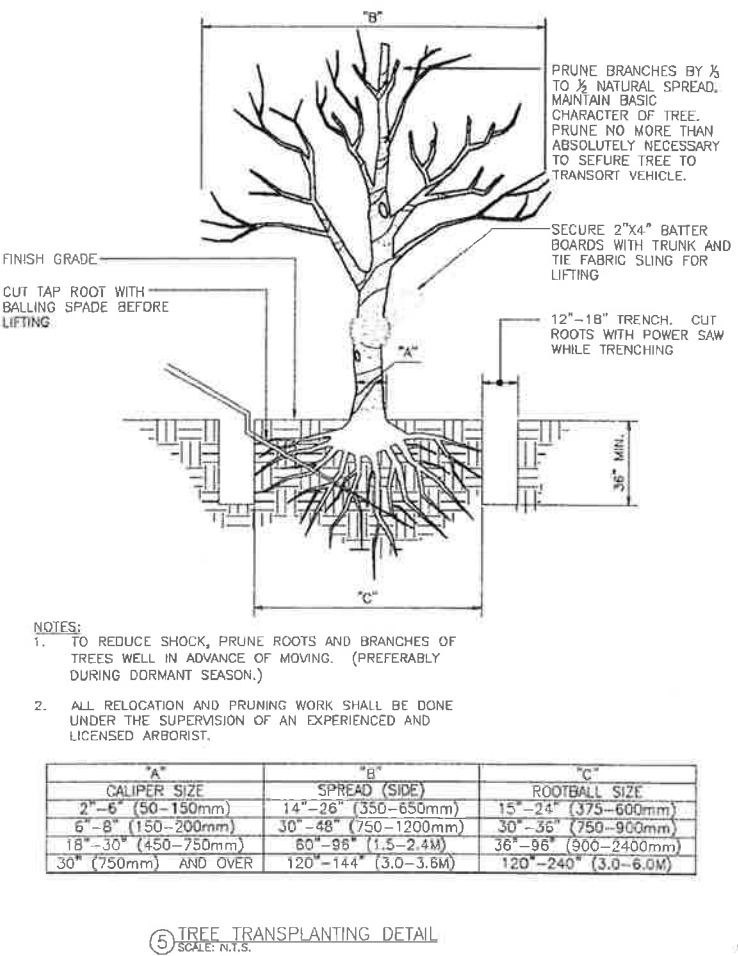
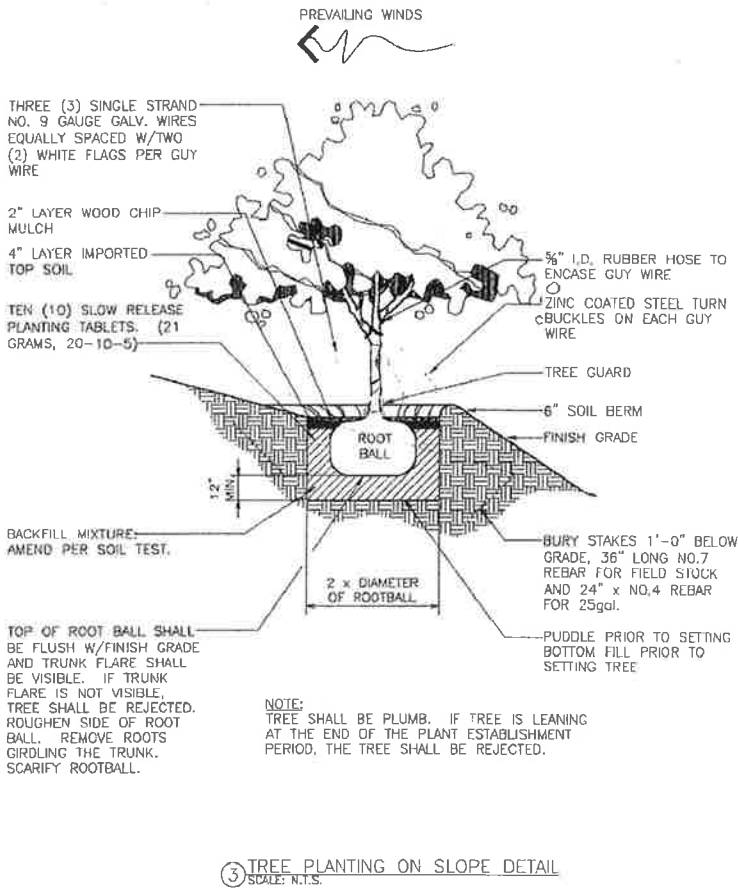
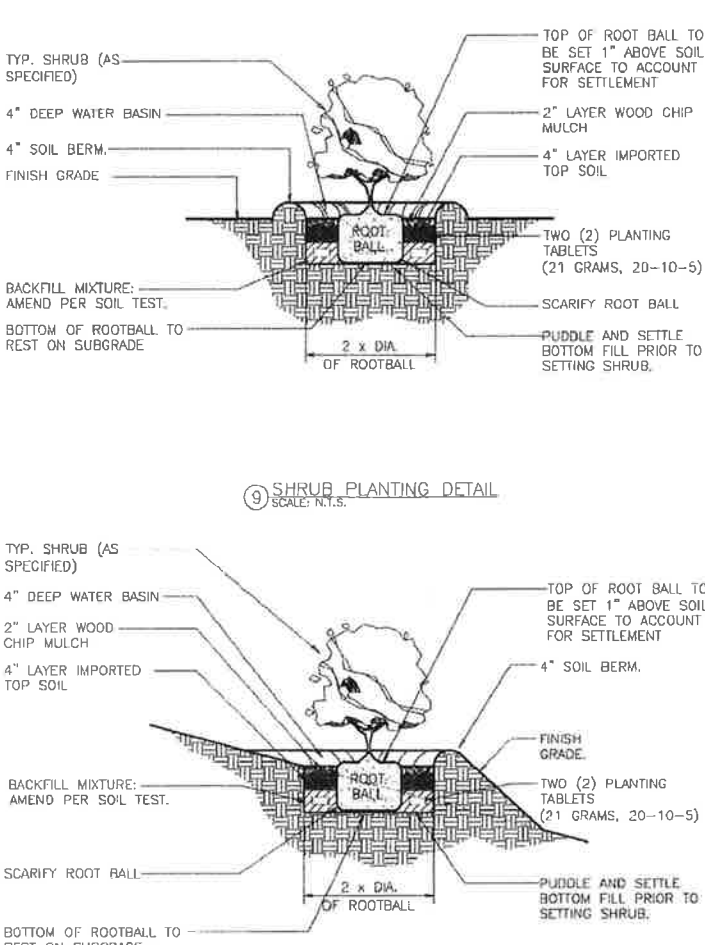
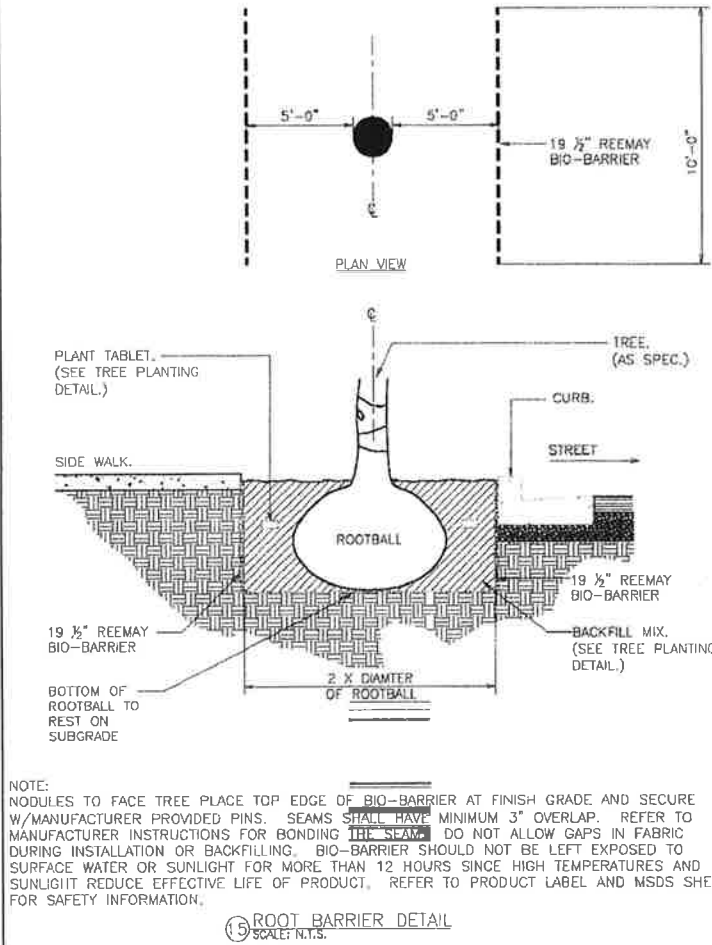
LANDSCAPE PLANTING PLAN - 6

QUEEN KAAHUMANU HIGHWAY WIDENING  
HENRY ST. to KEALAKEHE PKWY - PHASE I  
Federal Aid Project No. NH-019-1(20)  
Date: November 2009

AS-BUILT



FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-1(20)	2005	249	315



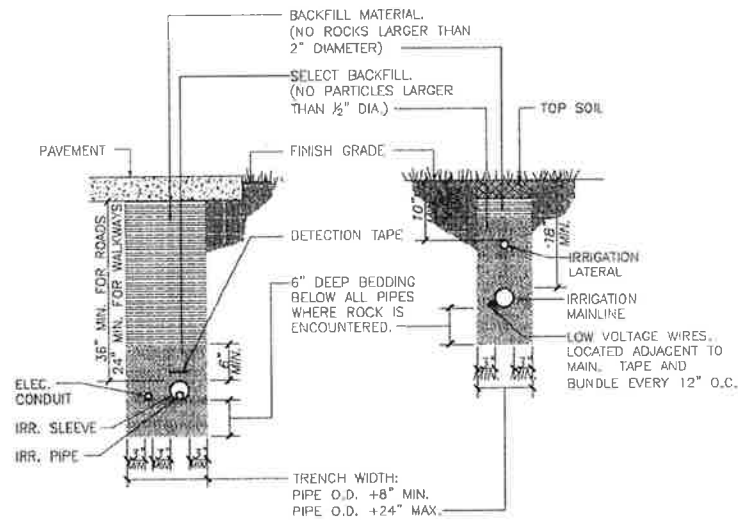
NOTE: ALL DETAILS REFERENCE THE 2006 DOT STANDARDS.

"A"	"B"	"C"
CALIPER SIZE	SPREAD (SIDE)	ROOTBALL SIZE
2"-6" (50-150mm)	14"-26" (350-650mm)	15"-24" (375-600mm)
6"-8" (150-200mm)	30"-48" (750-1200mm)	30"-36" (750-900mm)
18"-30" (450-750mm)	60"-96" (1.5-2.4M)	36"-96" (900-2400mm)
30" (750mm) AND OVER	120"-144" (3.0-3.6M)	120"-240" (3.0-6.0M)

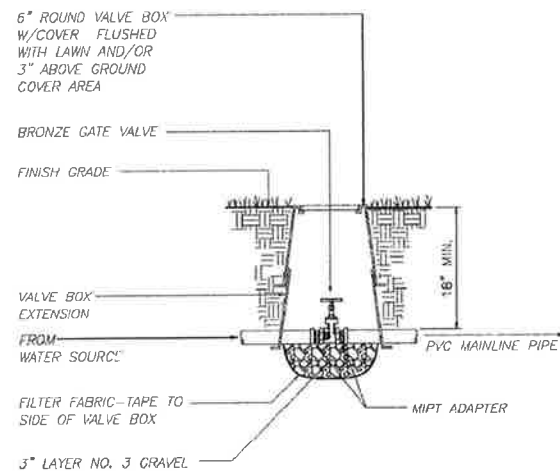
STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION  
LANDSCAPE DETAILS  
QUEEN KAAHUMANU HIGHWAY WIDENING  
HENRY ST. to KEALAKEHE PKWY - PHASE I  
Federal Aid Project No. NH-019-1(20)  
Date: November 2009



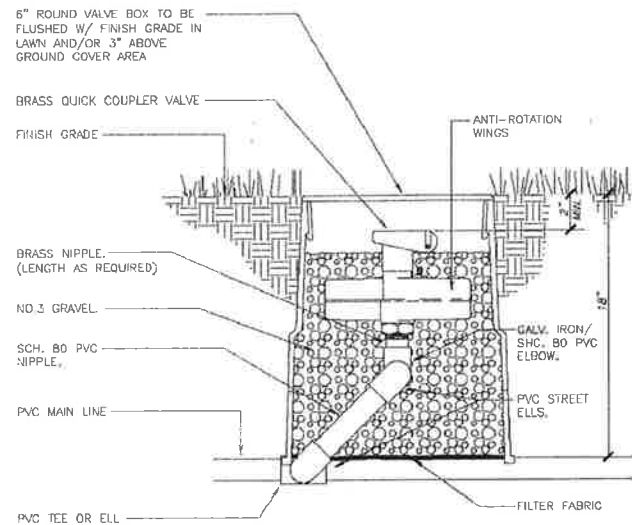
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-1(20)	2005	251	315



4.3 IRRIGATION TRENCH & WIRING DETAIL  
SCALE: N.T.S.



4.4 IGATE VALVE DETAIL  
SCALE: N.T.S.



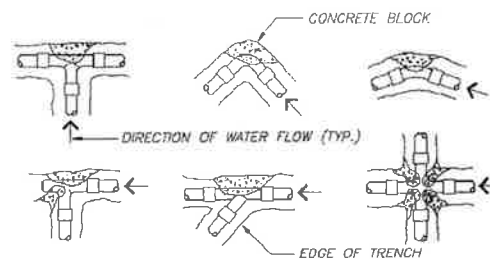
- NOTE:
1. KBI OR LASCO SWING JOINTS UPON APPROVAL BY ENGINEER.
  2. ALL VALVE BOX COVER SHALL BE LABELED VALVE TYPE, ZONE NUMBER AND, CONTROLLER NUMBER.
  3. CONTROLLER SHALL PROVIDE ONE (1) QUICK COUPLER KEY AND ONE (1) HOSE ELL FOR EACH QUICK COUPLER VALVE.

4.1 QUICK COUPLER VALVE DETAIL  
SCALE: N.T.S.

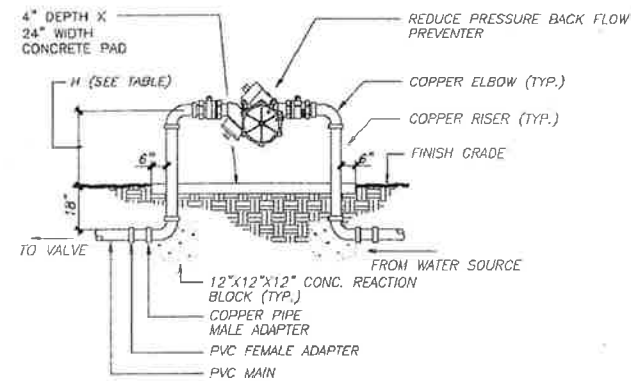
THRUST BLOCK BEARING AREA (SQ. FT.)				
PIPE SIZE	1 1/4" - 2 1/2"	3"	4"	6"
TEES/ELLS	1.00	1.00	1.25	3.2
90 BENDS	1.00	1.25	2.00	4.5
45 BENDS	1.00	1.00	1.00	2.4

NOTES:

1. INSTALL THRUST BLOCK AT ALL MACHINE BENDS, TEES OR ELLS AS SHOWN BELOW. THRUST BLOCKS SHALL BE MINIMUM OF (1) CU. FT. REDI-MIX CONCRETE OR 2500 PSI 28 DAY CONCRETE.
2. SET ALL THRUST BLOCKS AGAINST UNDISTURBED SOIL.



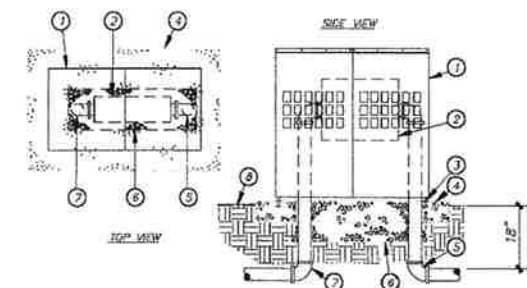
4.2 THRUST BLOCK DETAIL  
SCALE: N.T.S.



SIZE (INCHES)	H (INCHES)
3/4 TO 1-1/2	18
2 TO 3	24

- NOTES:
1. ALL PIPES AND FITTINGS INSTALLED ABOVE GRADE SHALL BE EITHER COPPER OR BRONZE ONLY.
  2. BACK FLOW PREVENTER SHALL BE PLUMB.
  3. BACK FLOW PREVENTER SHALL BE LOCATED IN AN AREA WELL PROTECTED FROM VEHICLES (CLEAR ZONE). IF THE BACK FLOW PREVENTOR IS LOCATED IN AN UNPROTECTED AREA, THEN FOUR (4) 6" PIPE BOLLARDS FILLED WITH CONCRETE SHALL SURROUND THE BACK FLOW PREVENTER.

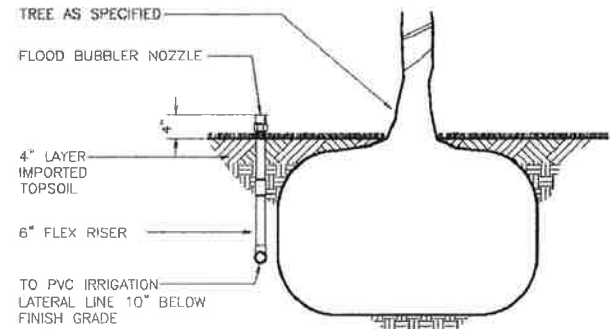
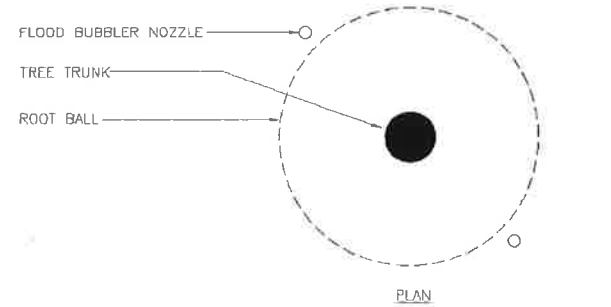
REDUCED PRESSURE BACKFLOW PREVENTION DEVICE DETAIL  
3.9 SCALE: N.T.S.



LEGEND

1. ALUMINUM BACK FLOW PREVENTER ENCLOSURE, W/"DOT IRRIGATION BACK FLOW PREVENTOR" MANNER ACCEPTABLE TO ENGINEER.
2. BACK FLOW PREVENTER
3. ANCHOR ROD (TYP.)
4. POURED CONCRETE BASE - 6" MIN. THICKNESS - EXTEND 4" BEYOND OUTSIDE DIMENSIONS OF ENCLOSURE.
5. WATER SERVICE INLET PIPING.
6. 4" LAYER 3/4" DIA WASHED ROCK.
7. WATER SERVICE OUTLET PIPING.
8. FINISH GRADE.
9. CONTRACTOR SHALL PROVIDE PADLOCK FOR DURATION OF THE PROJECT.
10. BACK FLOW PREVENTER SHALL BE LOCATED IN AN AREA WELL PROTECTED FROM VEHICLES (CLEAR ZONE). IF THE BACK FLOW PREVENTOR IS LOCATED IN AN UNPROTECTED AREA, THEN FOUR (4) 6" PIPE BOLLARDS FILLED WITH CONCRETE SHALL SURROUND THE BACK FLOW PREVENTER.

BACKFLOW PREVENTION DEVICE ENCLOSURE DETAIL  
4.0 SCALE: N.T.S.



3.7 TREE BUBBLER DETAIL  
SCALE: N.T.S.



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STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

LANDSCAPE DETAILS

QUEEN KAAHUMANU HIGHWAY WIDENING  
HENRY ST. to KEALAKEHE PKWY - PHASE I

Federal Aid Project No. NH-019-1(20)

Date: November 2009

SHEET No. L-17 OF 17 SHEETS

AS-BUILT

251