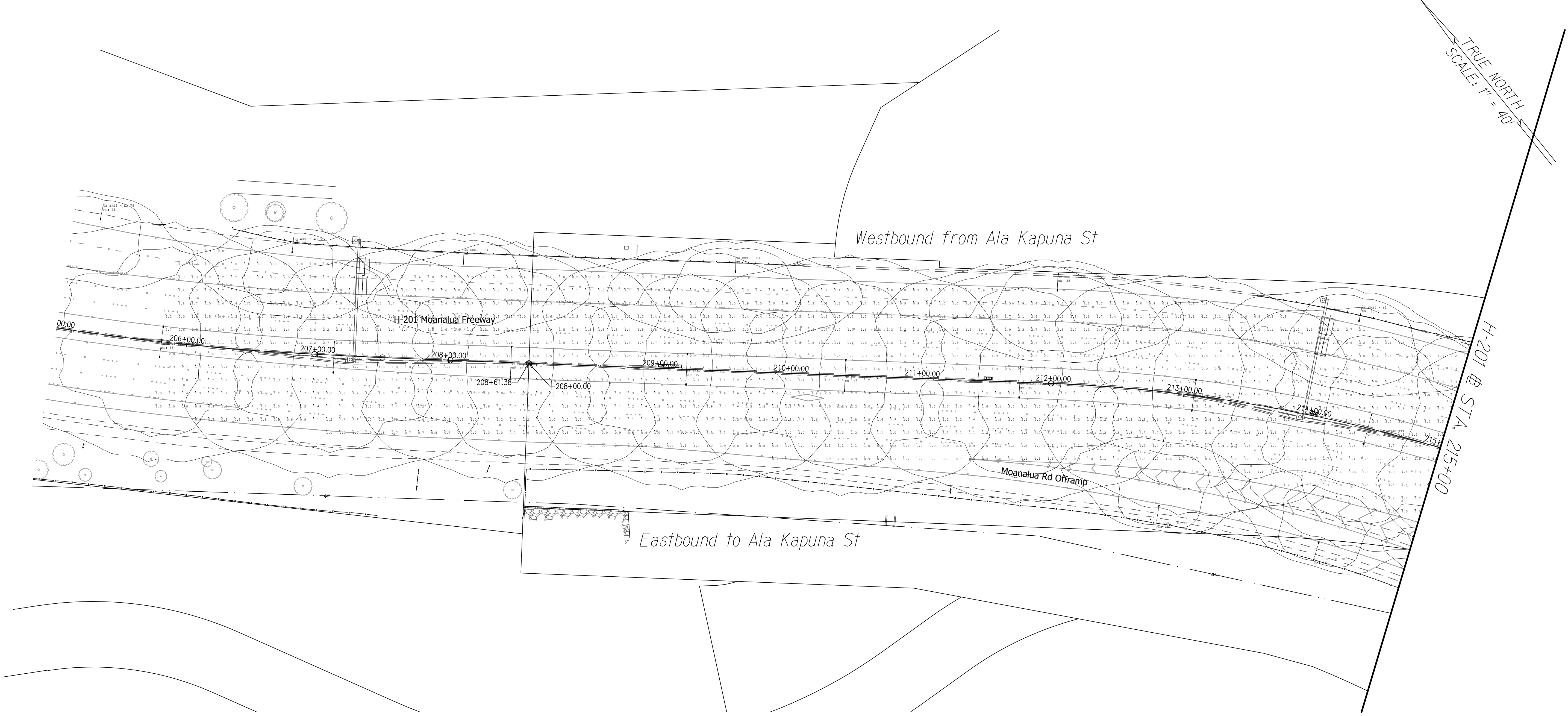
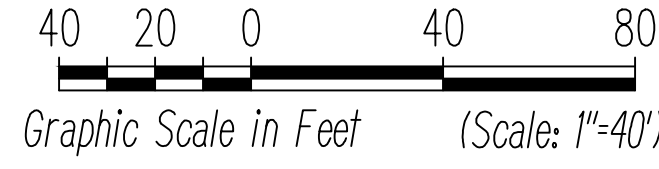


FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-H201(005) Ph2	2020	117	140



ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DESIGNED BY	
	QUANTITIES BY	
	CHECKED BY	
No.		

H-201 LIGHTING CALCULATIONS-1
Scale 1"=40'-0"

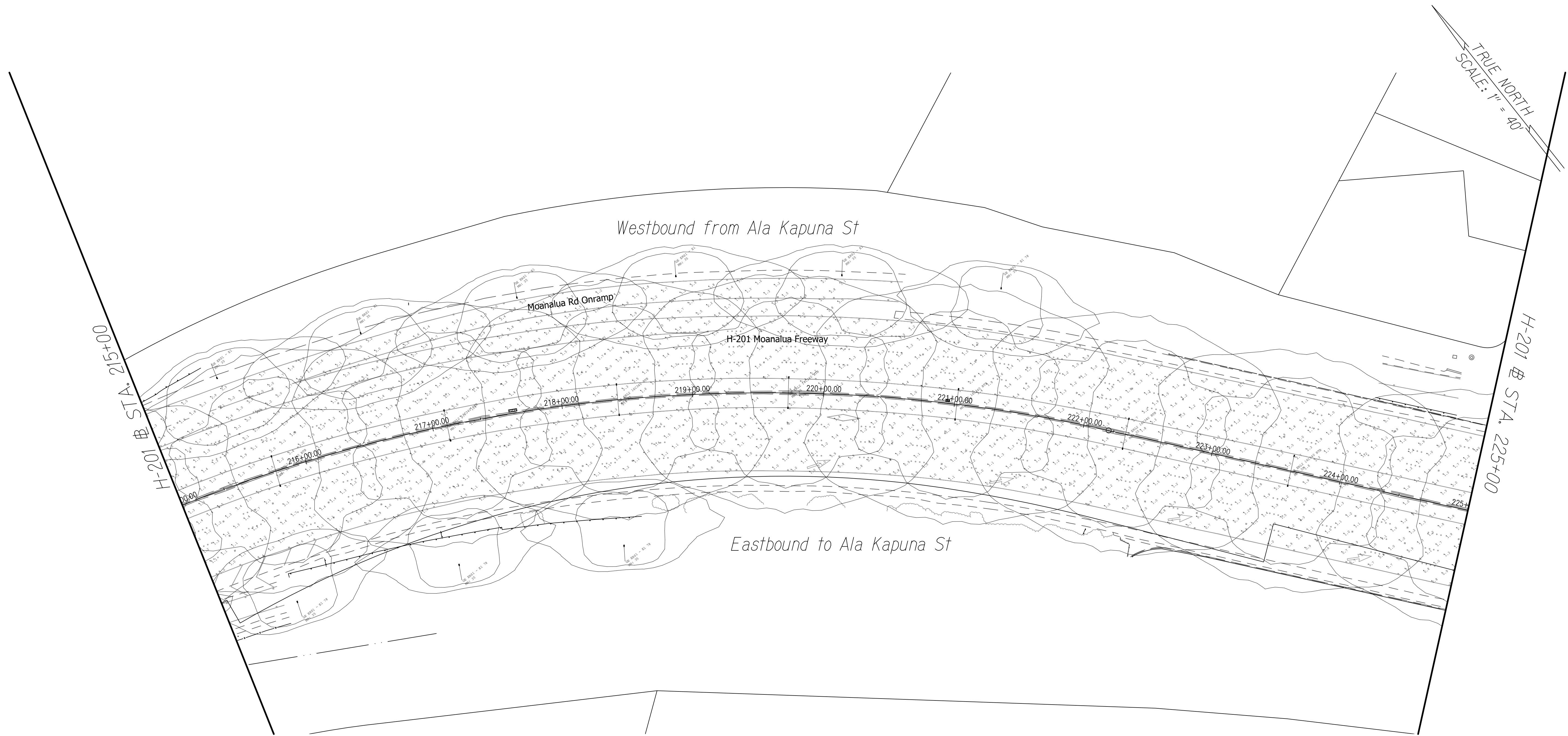


Glenn D. Oyama
LICENSED PROFESSIONAL ENGINEER
NO. 4210-E
HAWAII, U.S.A.

Glenn D. Oyama
EXPIRATION DATE OF THE LICENSE: 6/30/2022
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
H-201 LIGHTING CALCULATIONS
STA. 205+00 TO 215+00
MOANALUA FREEWAY, HIGHWAY LIGHTING IMPROVEMENTS
Halawa Heights Off-ramp to Middle St. Overpass
FAP NO. NH-H201(005) PHASE 2
Scale: 1" = 40'-0" Date: July 2020
SHEET No. E-16 OF 39 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-H201(005) Ph2	2020	118	140



ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DRAWN BY	
	DESIGNED BY	
	QUANTITIES BY	
NOTE BOOK	CHECKED BY	
	No.	

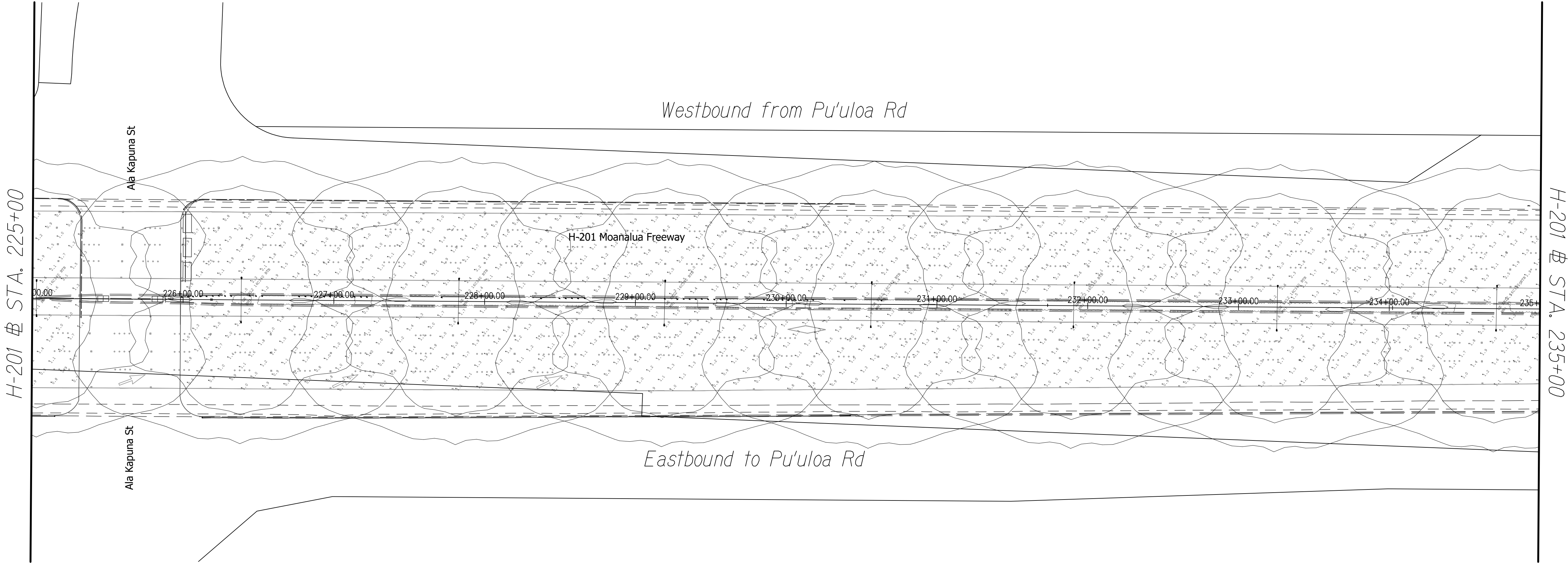
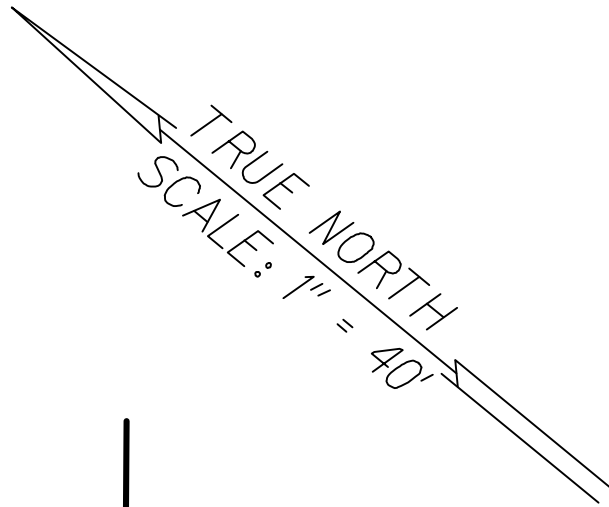
H-201 LIGHTING CALCULATIONS-2
Scale 1"=40'-0"



Glenn D. Oyama
EXPIRATION DATE OF THE LICENSE: 4/30/2022
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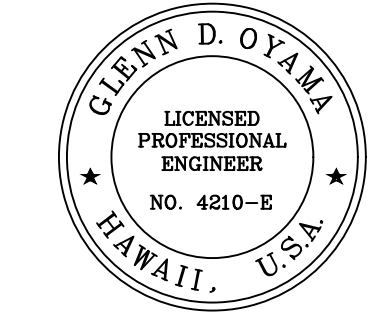
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
H-201 LIGHTING CALCULATIONS
STA. 215+00 TO 225+00
MOANALUA FREEWAY, HIGHWAY LIGHTING IMPROVEMENTS
Halawa Heights Off-ramp to Middle St. Overpass
FAP NO. NH-H201(005) PHASE 2
Scale: 1" = 40'-0" Date: July 2020
SHEET No. E-17 OF 39 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-H201(005) Ph2	2020	119	140



ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DRAWN BY	
	DESIGNED BY	
	CHECKED BY	
NOTE BOOK No.	QUANTITIES BY	
	CHECKED BY	

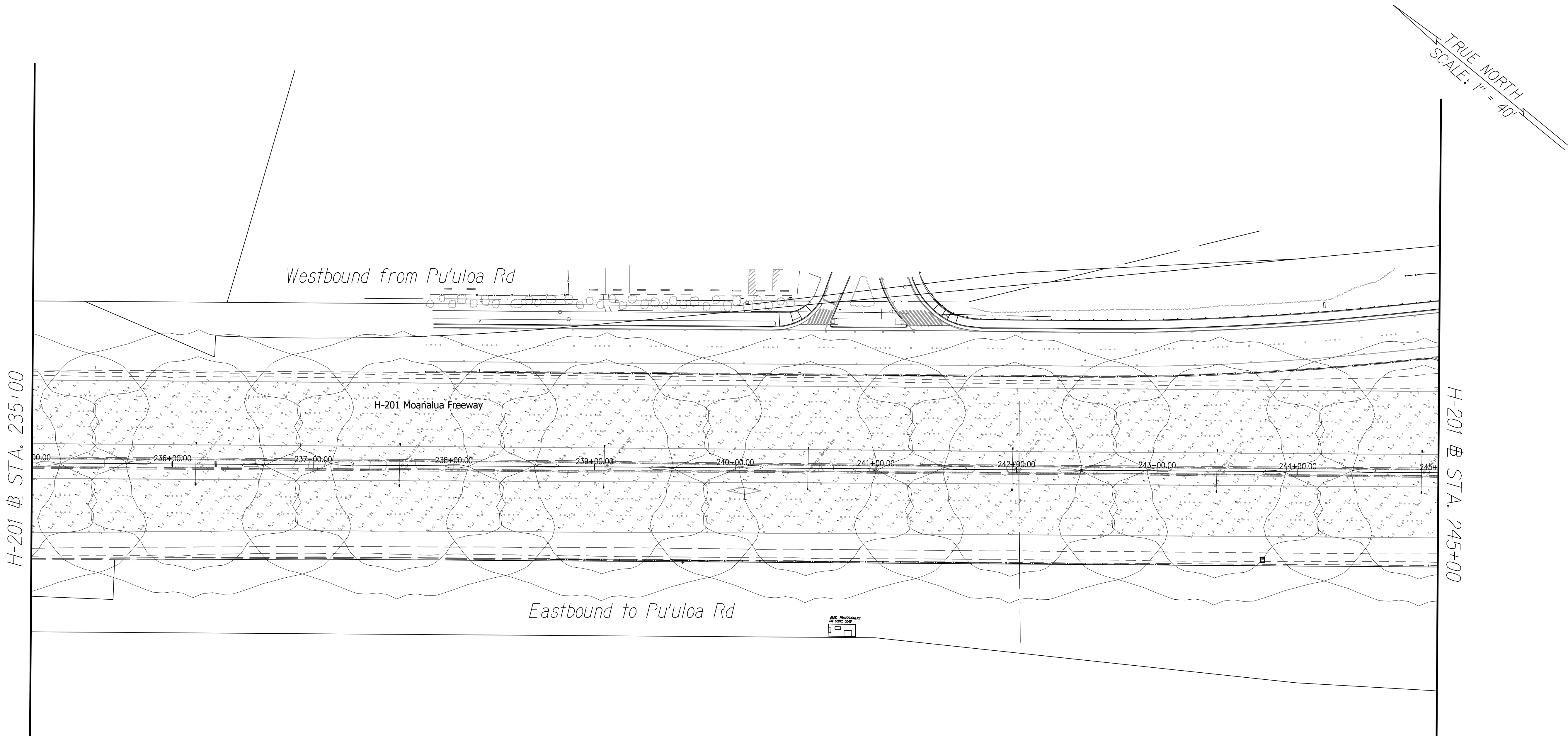
H-201 LIGHTING CALCULATIONS-3
Scale 1"=40'-0"



Glenn D. Oyama
EXPIRATION DATE OF THE LICENSE 11/30/2022
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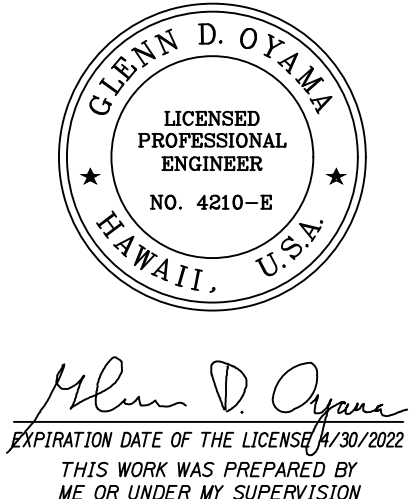
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
H-201 LIGHTING CALCULATIONS
STA. 225+00 TO 235+00
MOANALUA FREEWAY, HIGHWAY LIGHTING IMPROVEMENTS
Halawa Heights Off-ramp to Middle St. Overpass
FAP NO. NH-H201(005) PHASE 2
Scale: 1" = 40'-0" Date: July 2020
SHEET No. E-18 OF 39 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-H201(005) Ph2	2020	120	140



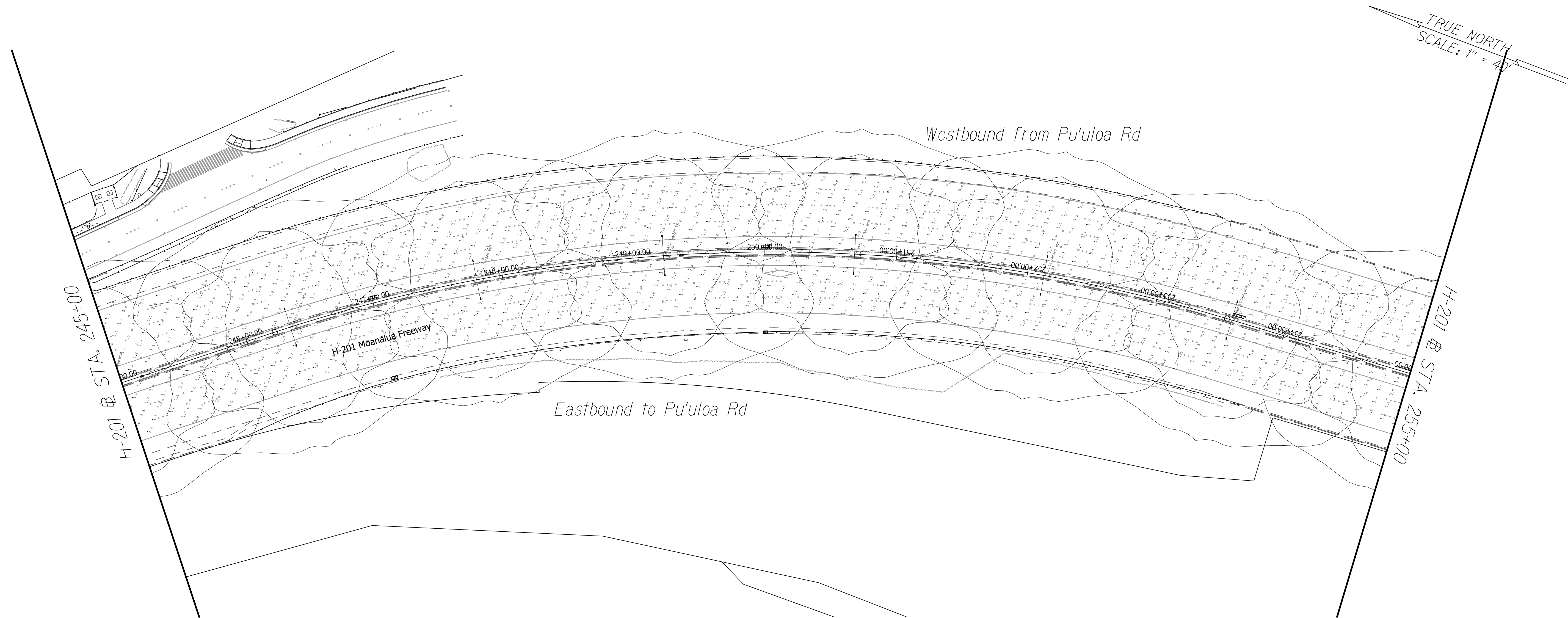
ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
NOTE BOOK	DESIGNED BY	
No.	CHECKED BY	

H-201 LIGHTING CALCULATIONS-4
Scale 1"=40'-0"



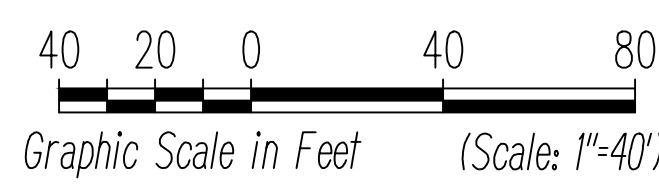
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
H-201 LIGHTING CALCULATIONS
STA. 235+00 TO 245+00
MOANALUA FREEWAY, HIGHWAY LIGHTING IMPROVEMENTS
Halawa Heights Off-ramp to Middle St. Overpass
FAP NO. NH-H201(005) PHASE 2
Scale: 1" = 40'-0" Date: July 2020
SHEET No. E-19 OF 39 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-H201(005) Ph2	2020	121	140



ORIGINAL PLAN	SURVEY PLOTTED BY _____ DATE _____	
	DRAWN BY _____	_____
	DESIGNED BY _____	_____
	QUANTITIES BY _____	_____
NOTE BOOK No. _____	CHECKED BY _____	_____

H-201 LIGHTING CALCULATIONS-5
Scale 1"=40'-0"

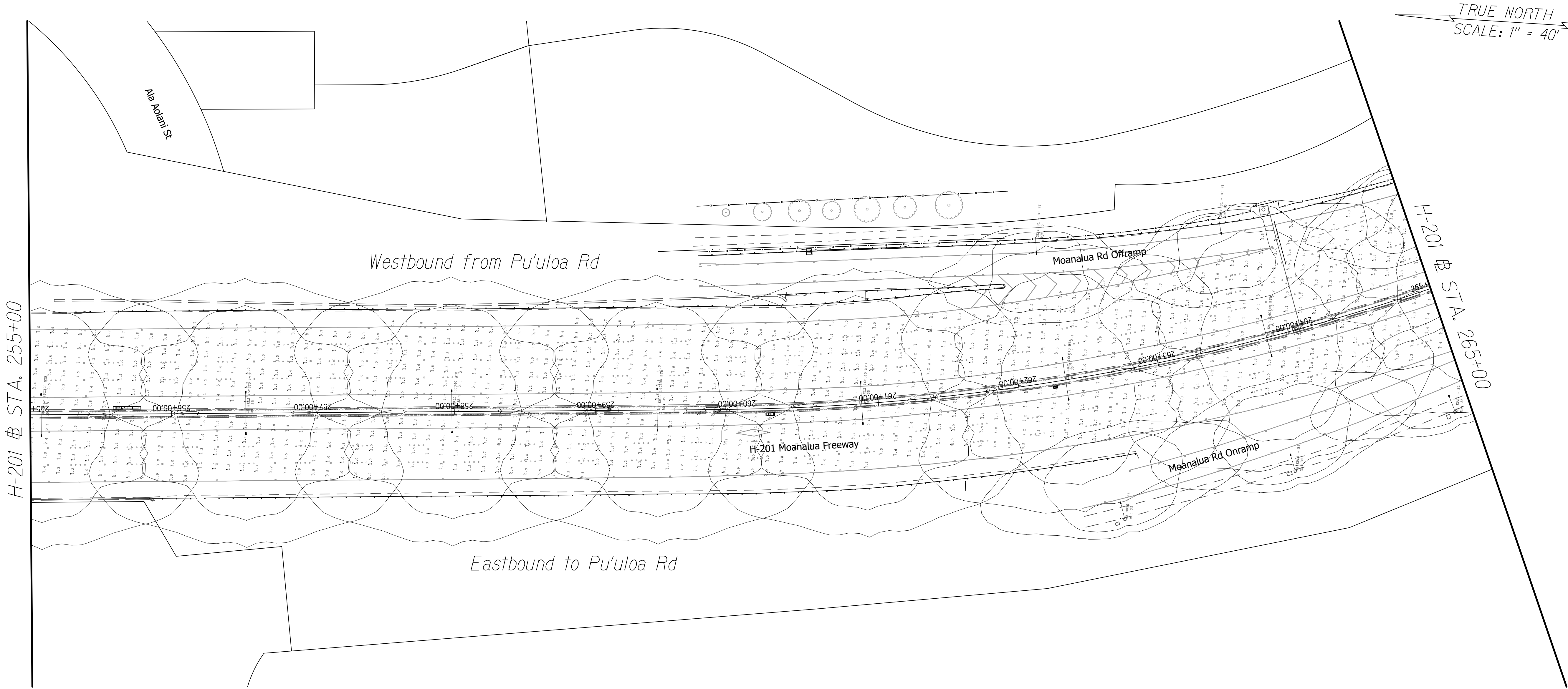


Glenn D. Oyama
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NO. 4210-E
HAWAII, U.S.A.

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THIS WORK WAS PREPARED BY
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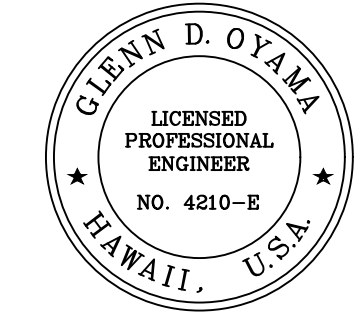
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
H-201 LIGHTING CALCULATIONS
STA. 245+00 TO 255+00
MOANALUA FREEWAY, HIGHWAY LIGHTING IMPROVEMENTS
Halawa Heights Off-ramp to Middle St. Overpass
FAP NO. NH-H201(005) PHASE 2
Scale: 1" = 40'-0" Date: July 2020
SHEET No. E-20 OF 39 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-H201(005) Ph2	2020	122	140



ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DRAWN BY	
	DESIGNED BY	
	QUANTITIES BY	
NOTE BOOK	CHECKED BY	
	No.	

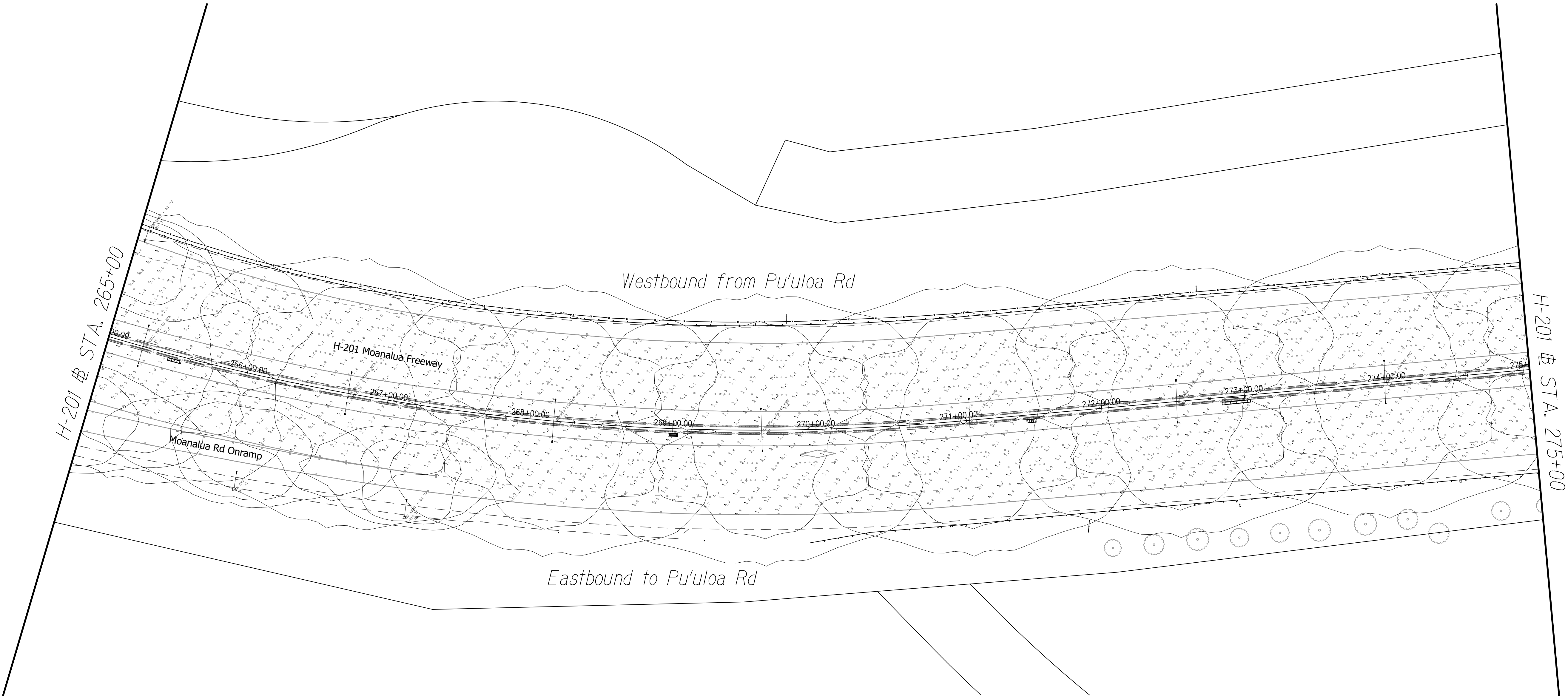
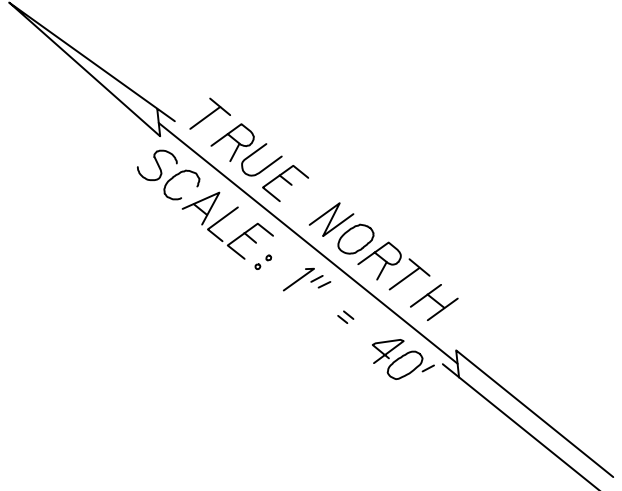
H-201 LIGHTING CALCULATIONS-6
Scale 1"=40'-0"



Glenn D. Oyama
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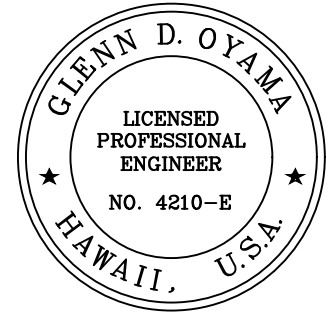
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
H-201 LIGHTING CALCULATIONS
STA. 255+00 TO 265+00
MOANALUA FREEWAY, HIGHWAY LIGHTING IMPROVEMENTS
Halawa Heights Off-ramp to Middle St. Overpass
FAP NO. NH-H201(005) PHASE 2
Scale: 1" = 40'-0" Date: July 2020
SHEET No. E-21 OF 39 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-H201(005) Ph2	2020	123	140



ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DRAWN BY	
	DESIGNED BY	
	QUANTITIES BY	
NOTE BOOK	CHECKED BY	
	No.	

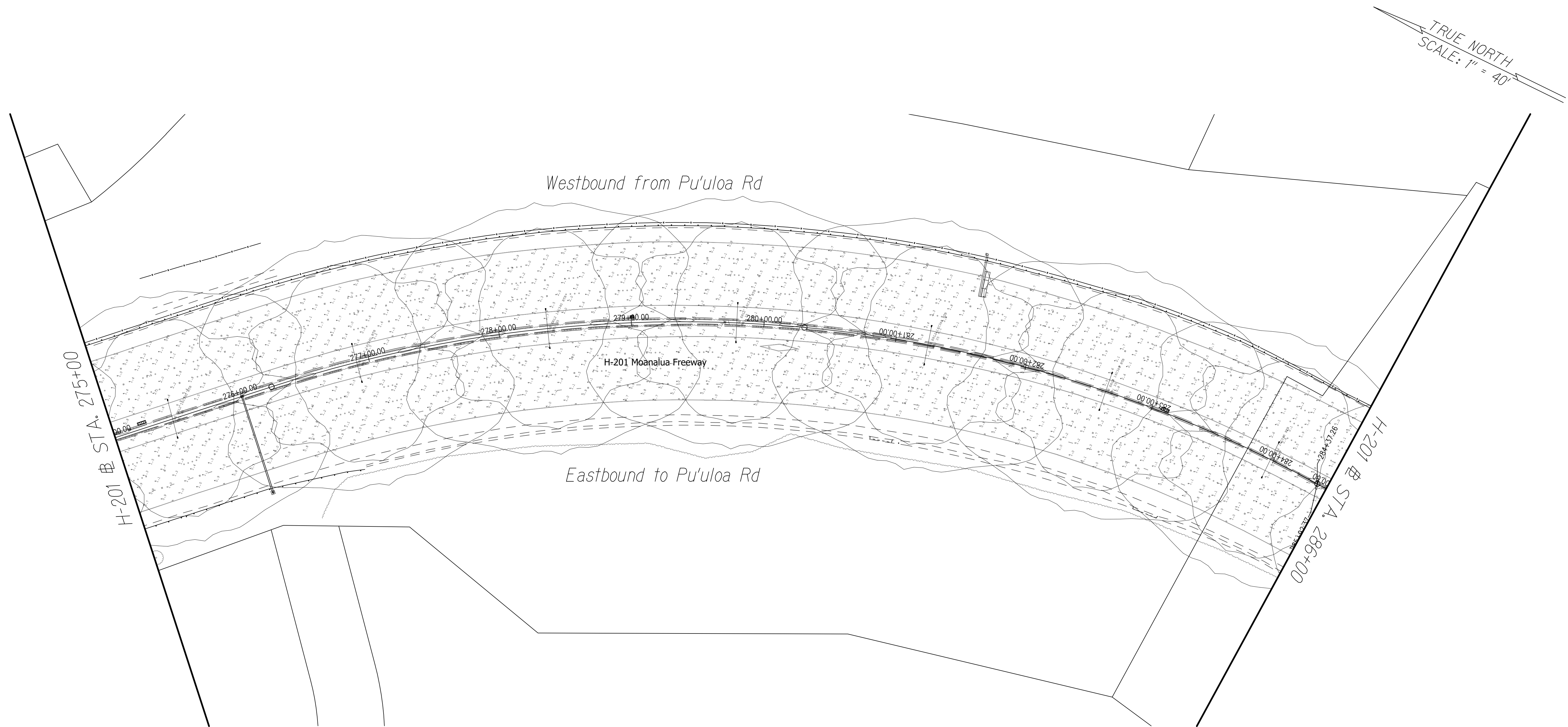
H-201 LIGHTING CALCULATIONS-7
Scale 1"=40'-0"



Glenn D. Oyama
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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
H-201 LIGHTING CALCULATIONS
STA. 265+00 TO 275+00
MOANALUA FREEWAY, HIGHWAY LIGHTING IMPROVEMENTS
Halawa Heights Off-ramp to Middle St. Overpass
FAP NO. NH-H201(005) PHASE 2
Scale: 1" = 40'-0" Date: July 2020
SHEET No. E-22 OF 39 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-H201(005) Ph2	2020	124	140



ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DESIGNED BY	
NOTE BOOK	QUANTITIES BY	
	CHECKED BY	
No.		

H-201 LIGHTING CALCULATIONS-8
Scale 1"=40'-0"

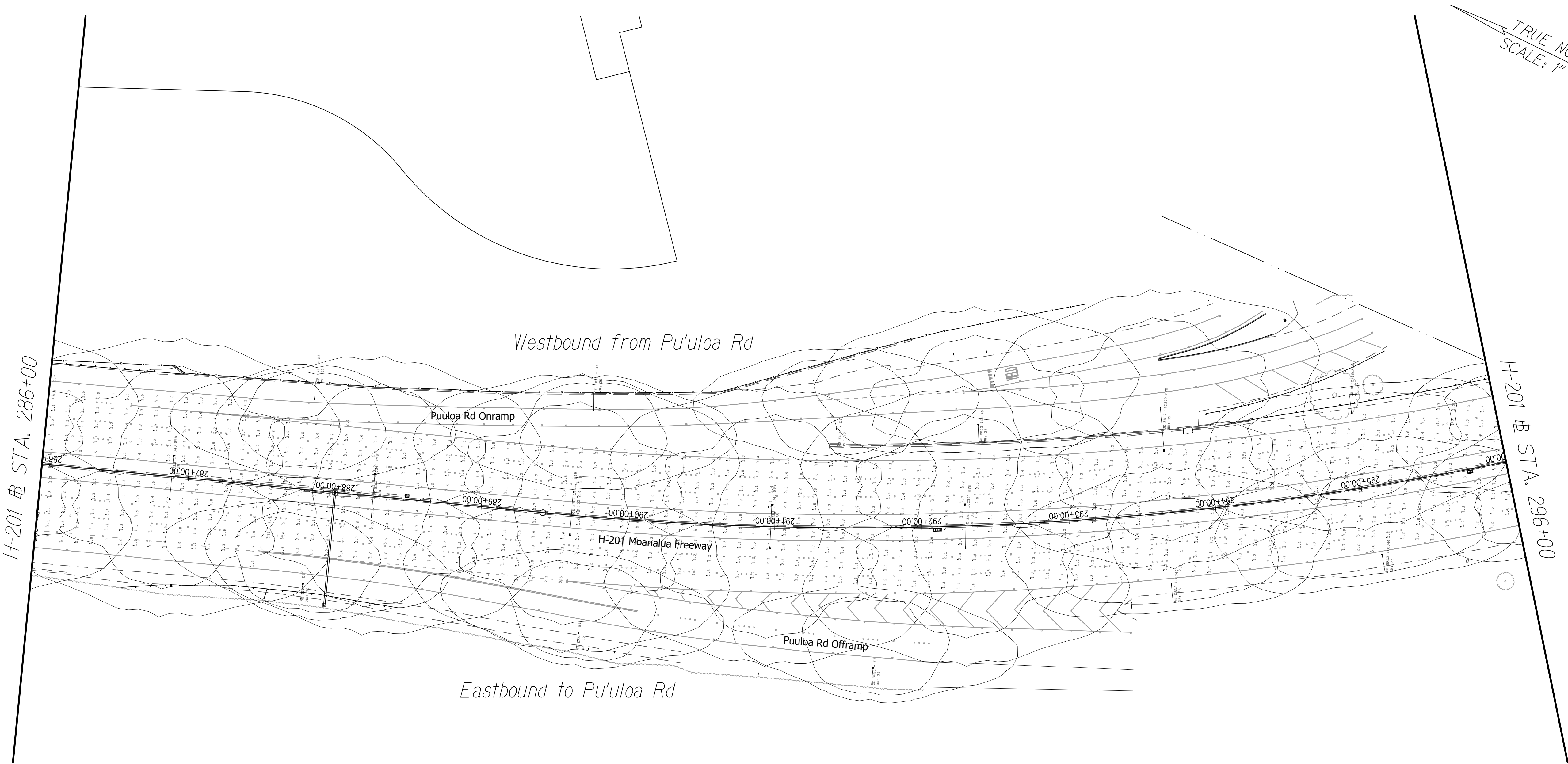


GLENN D. OTAMA
LICENSED PROFESSIONAL ENGINEER
NO. 4210-E
HAWAII, U.S.A.

Glenn D. Otama
EXPIRATION DATE OF THE LICENSE 4/30/2022
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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
H-201 LIGHTING CALCULATIONS
STA. 275+00 TO 286+00
MOANALUA FREEWAY, HIGHWAY LIGHTING IMPROVEMENTS
Halawa Heights Off-ramp to Middle St. Overpass
FAP NO. NH-H201(005) PHASE 2
Scale: 1" = 40'-0" Date: July 2020
SHEET No. E-23 OF 39 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-H201(005) Ph2	2020	125	140



ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DESIGNED BY	
	DESIGNED BY	
	DESIGNED BY	
NOTE BOOK	QUANTITIES BY	
	QUANTITIES BY	
	QUANTITIES BY	
	QUANTITIES BY	
No.	CHECKED BY	
	CHECKED BY	
	CHECKED BY	
	CHECKED BY	

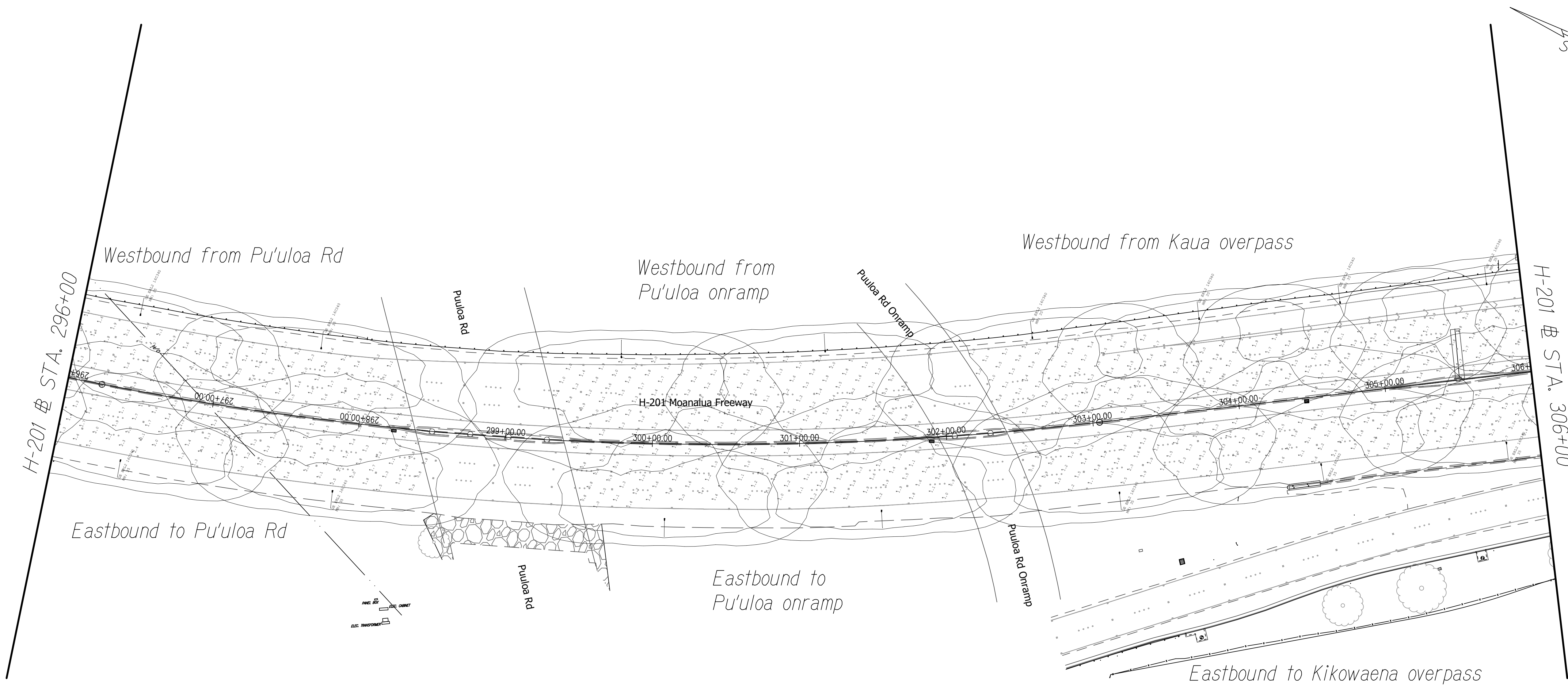
H-201 LIGHTING CALCULATIONS-9
Scale 1"=40'-0"



Glenn D. Oyama
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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
H-201 LIGHTING CALCULATIONS
STA. 286+00 TO 296+00
MOANALUA FREEWAY, HIGHWAY LIGHTING IMPROVEMENTS
Halawa Heights Off-ramp to Middle St. Overpass
FAP NO. NH-H201(005) PHASE 2
Scale: 1" = 40'-0" Date: July 2020
SHEET No. E-24 OF 39 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-H201(005) Ph2	2020	126	140



ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
NOTE BOOK	DESIGNED BY	
No.	QUANTITIES BY	
	CHECKED BY	

H-201 LIGHTING CALCULATIONS-10
Scale 1"=40'-0"

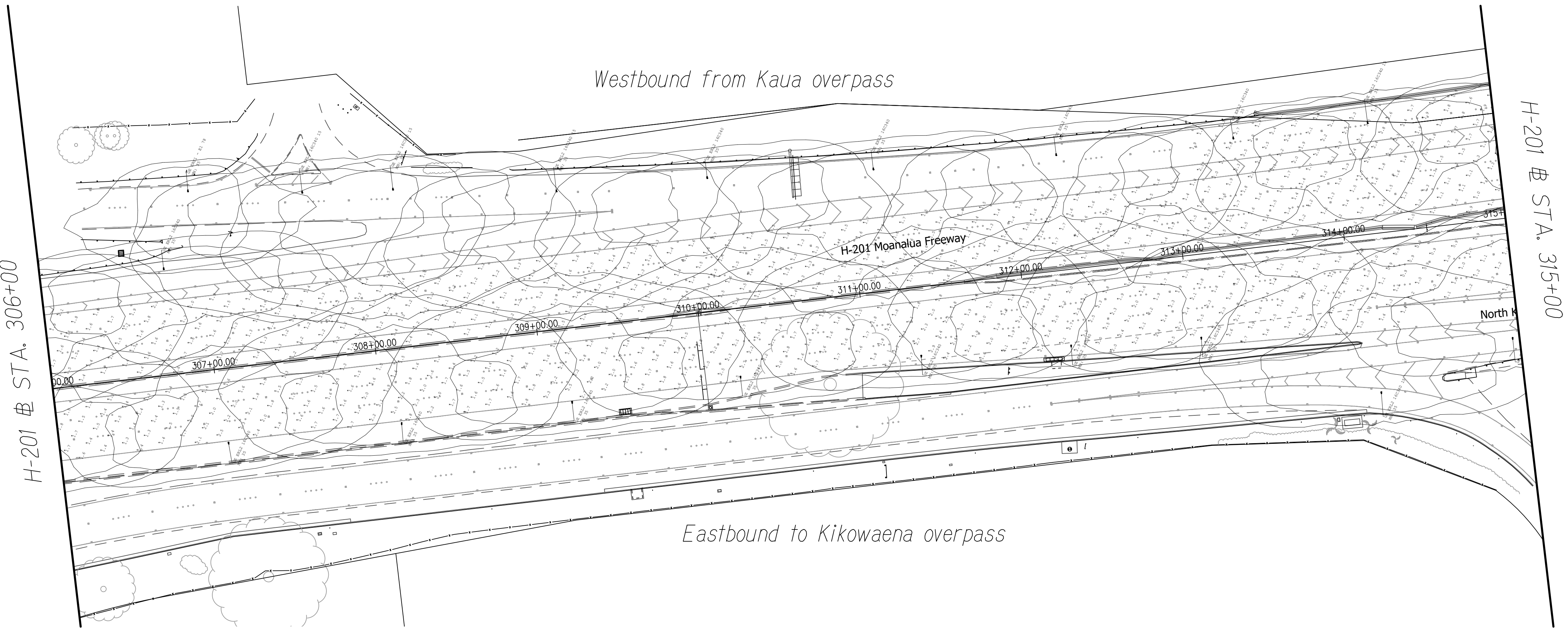
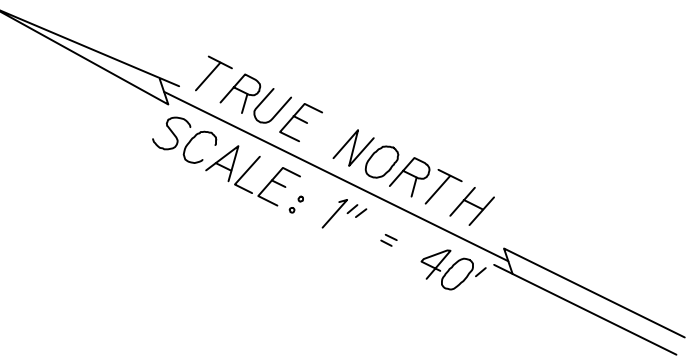


GLENN D. OYAMA
LICENSED PROFESSIONAL ENGINEER
NO. 4210-E
HAWAII, U.S.A.

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THIS WORK WAS PREPARED BY
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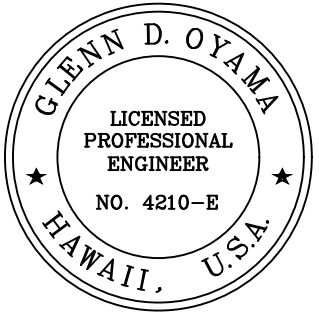
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
H-201 LIGHTING CALCULATIONS
STA. 296+00 TO 306+00
MOANALUA FREEWAY, HIGHWAY LIGHTING IMPROVEMENTS
Halawa Heights Off-ramp to Middle St. Overpass
FAP NO. NH-H201(005) PHASE 2
Scale: 1" = 40'-0" Date: July 2020
SHEET No. E-25 OF 39 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-H201(005) Ph2	2020	127	140



ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DESIGNED BY	
	QUANTITIES BY	
	CHECKED BY	

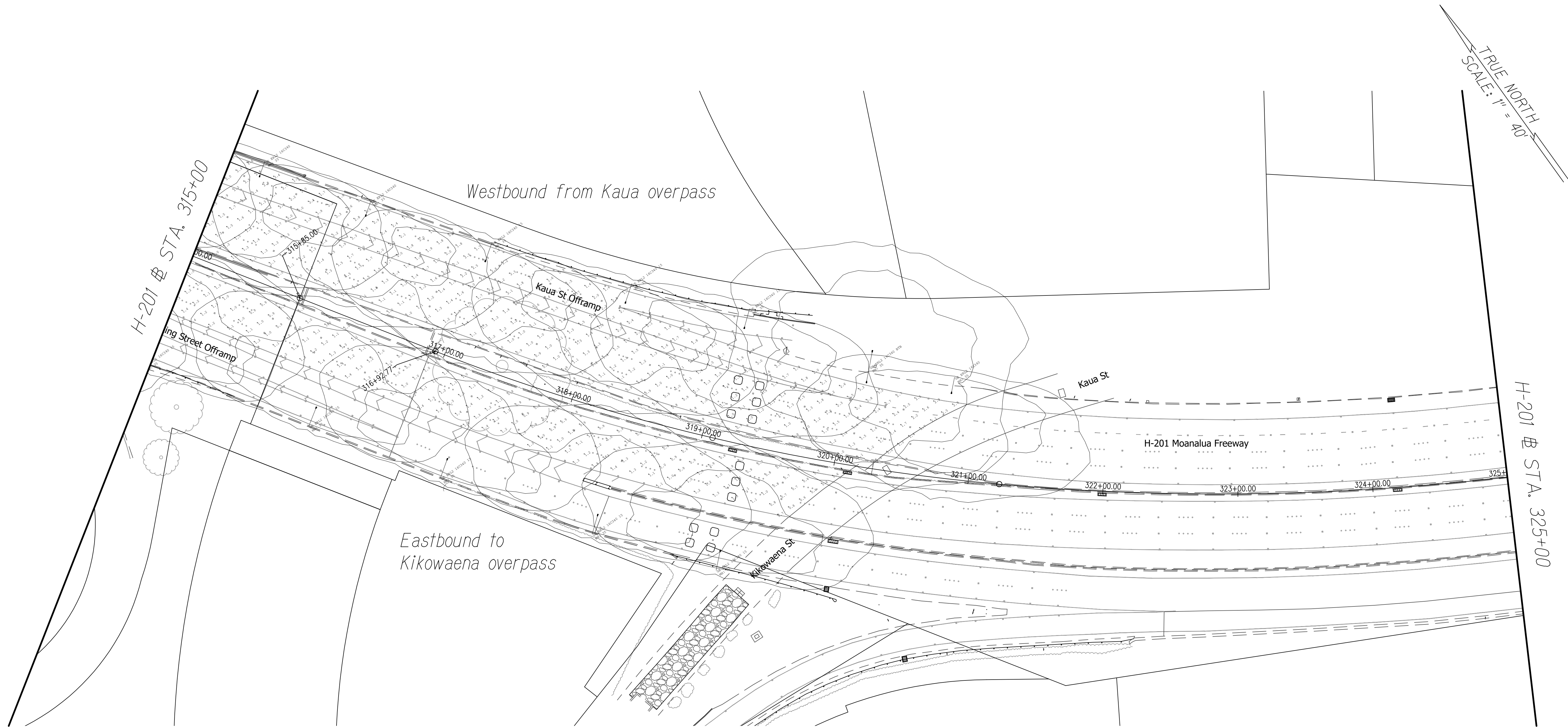
H-201 LIGHTING CALCULATIONS-11
Scale 1"=40'-0"



Glenn D. Oyama
EXPIRATION DATE OF THE LICENSE 4/30/2022
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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
H-201 LIGHTING CALCULATIONS
STA. 306+00 TO 315+00
MOANALUA FREEWAY, HIGHWAY LIGHTING IMPROVEMENTS
Halawa Heights Off-ramp to Middle St. Overpass
FAP NO. NH-H201(005) PHASE 2
Scale: 1" = 40'-0" Date: July 2020
SHEET No. E-26 OF 39 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-H201(005) Ph2	2020	128	140



ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
NOTE BOOK	DESIGNED BY	
	QUANTITIES BY	
	CHECKED BY	

H-201 LIGHTING CALCULATIONS-12
Scale 1"=40'-0"



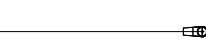
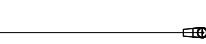
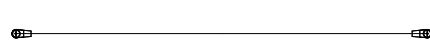
Glenn D. Oyama
EXPIRATION DATE OF THE LICENSE 11/30/2022
THIS WORK WAS PREPARED BY
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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
H-201 LIGHTING CALCULATIONS
STA. 315+00 TO 325+00
MOANALUA FREEWAY, HIGHWAY LIGHTING IMPROVEMENTS
Halawa Heights Off-ramp to Middle St. Overpass
FAP NO. NH-H201(005) PHASE 2
Scale: 1" = 40'-0" Date: July 2020
SHEET No. E-27 OF 39 SHEETS

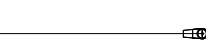
ORIGINAL PLAN	No. _____	SURVEY PLOTTED BY _____	DATE _____
			DRAWN BY _____
			DESIGNED BY _____
			CHECKED BY _____
NOTE BOOK	No. _____	QUANTITIES BY _____	DESIGNED BY _____
			CHECKED BY _____
			DATE _____
			EXPIRATION DATE OF THE LICENSE _____

Luminaire Schedule						
Symbol	Qty	Label	Arrangement	Lum. Watts	LLF	Description
	8	GE ERS1 - E1 78	SINGLE	78	0.850	GE ERS1 78W E1 - 12' Arm
	9	GE ERS1 - E1	SINGLE	108	0.850	GE ERS1 108W E1 - 12' Arm
	16	GE ERL2 16C340 BTB	BACK-BACK	120	0.850	GE ERL2 120W C3 BTB - 12' Arm

Calculation Summary							
Label	CalcType	Units	Avg	Max	Min	Avg/Min	Max/Min
Eastbound to Ala Kapuna St	Illuminance	Fc	1.36	2.9	0.7	1.94	4.14
Westbound from Ala Kapuna St	Illuminance	Fc	1.62	3.4	0.7	2.31	4.86

Luminaire Schedule						
Symbol	Qty	Label	Arrangement	Lum. Watts	LLF	Description
	4	GE ERS1 - E1 78	SINGLE	78	0.850	GE ERS1 78W E1 - 12' Arm
	10	GE ERS1 - E1	SINGLE	108	0.850	GE ERS1 108W E1 - 12' Arm
	8	GE ERL2 16C340	SINGLE	120	0.850	GE ERL2 120W C3 - 12' Arm
	47	GE ERL2 16C340 BTB	BACK-BACK	120	0.850	GE ERL2 120W C3 BTB - 12' Arm

Calculation Summary							
Label	CalcType	Units	Avg	Max	Min	Avg/Min	Max/Min
Eastbound to Puuloa Rd	Illuminance	Fc	1.33	3.2	0.6	2.22	5.33
Westbound from Puuloa Rd	Illuminance	Fc	1.27	3.2	0.6	2.12	5.33

Luminaire Schedule						
Symbol	Qty	Label	Arrangement	Lum. Watts	LLF	Description
	4	GE ERL2 16C340	SINGLE	120	0.850	GE ERL2 120W C3 - 12' Arm

Calculation Summary							
Label	CalcType	Units	Avg	Max	Min	Avg/Min	Max/Min
Eastbound to Puuloa on ramp	Illuminance	Fc	1.20	2.2	0.7	1.71	3.14
Westbound from Puuloa on ramp	Illuminance	Fc	1.25	2.5	0.6	2.08	4.17

Luminaire Schedule						
Symbol	Qty	Label	Arrangement	Lum. Watts	LLF	Description
	1	GE ERS1 - E1 78	SINGLE	78	0.850	GE ERS1 78W E1 - 12' Arm
	22	GE ERL2 16C340	SINGLE	120	0.850	GE ERL2 120W C3 - 12' Arm
	13	GE ERL2 16C340 15	SINGLE	120	0.850	GE ERL2 120W C3 - 15' Arm
	1	GE ERL2 16C340 BTB	BACK-BACK	120	0.850	GE ERL2 120W C3 BTB - 12' Arm

Calculation Summary							
Label	CalcType	Units	Avg	Max	Min	Avg/Min	Max/Min
Eastbound to Kikowaena overpass	Illuminance	Fc	1.50	3.1	0.6	2.50	5.17
Westbound from Kaua overpass	Illuminance	Fc	1.56	3.2	0.8	1.95	4.00



Glenn D. Oyama
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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
H-201 LIGHTING
CALCULATIONS SUMMARY
MOANALUA FREEWAY, HIGHWAY LIGHTING IMPROVEMENTS
Halawa Heights Off-ramp to Middle St. Overpass
FAP NO. NH-H201(005) PHASE 2

Scale: _____ Date: July 2020

SHEET No. *E-28* OF 39 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-H201(005) Ph2	2020	129	140