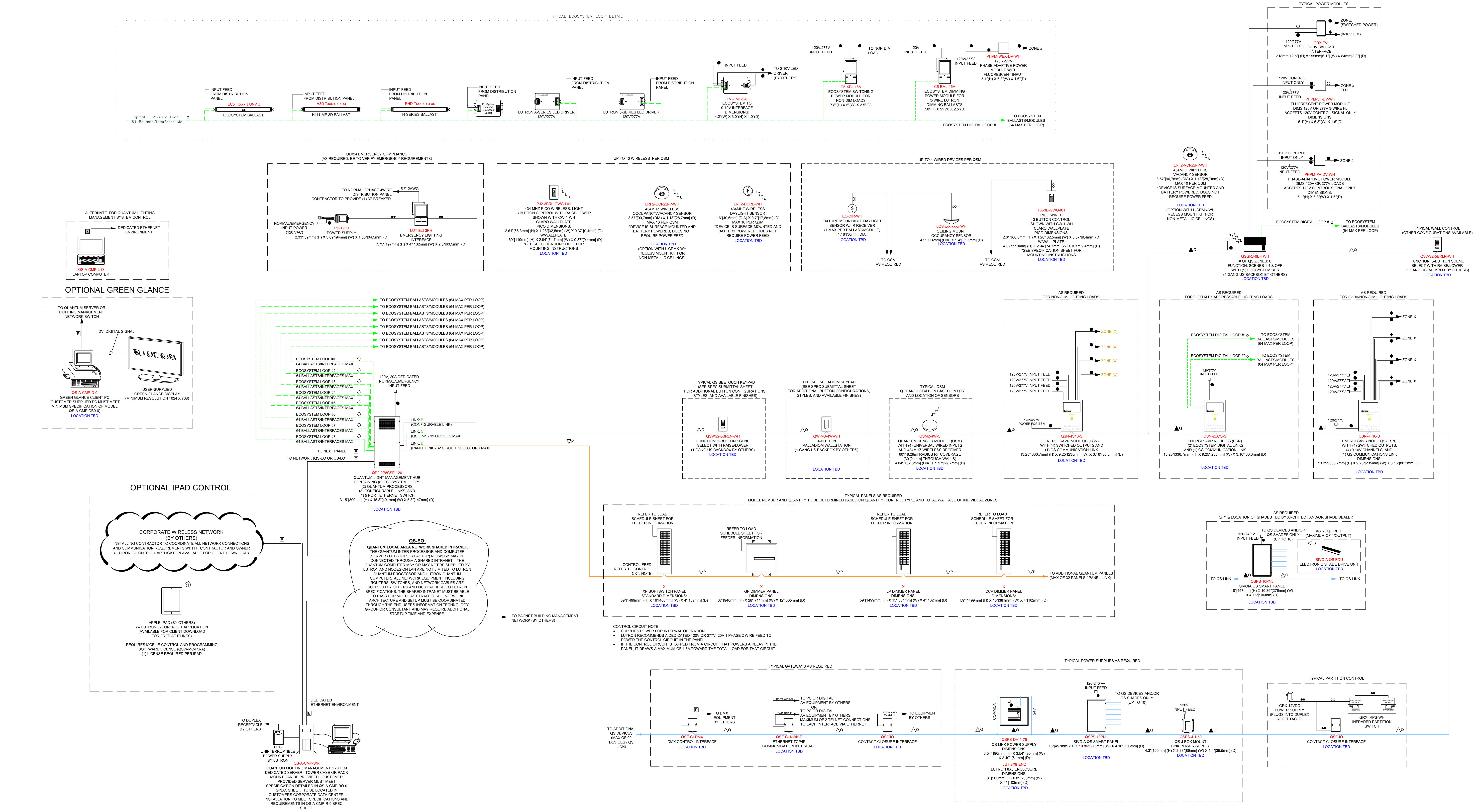

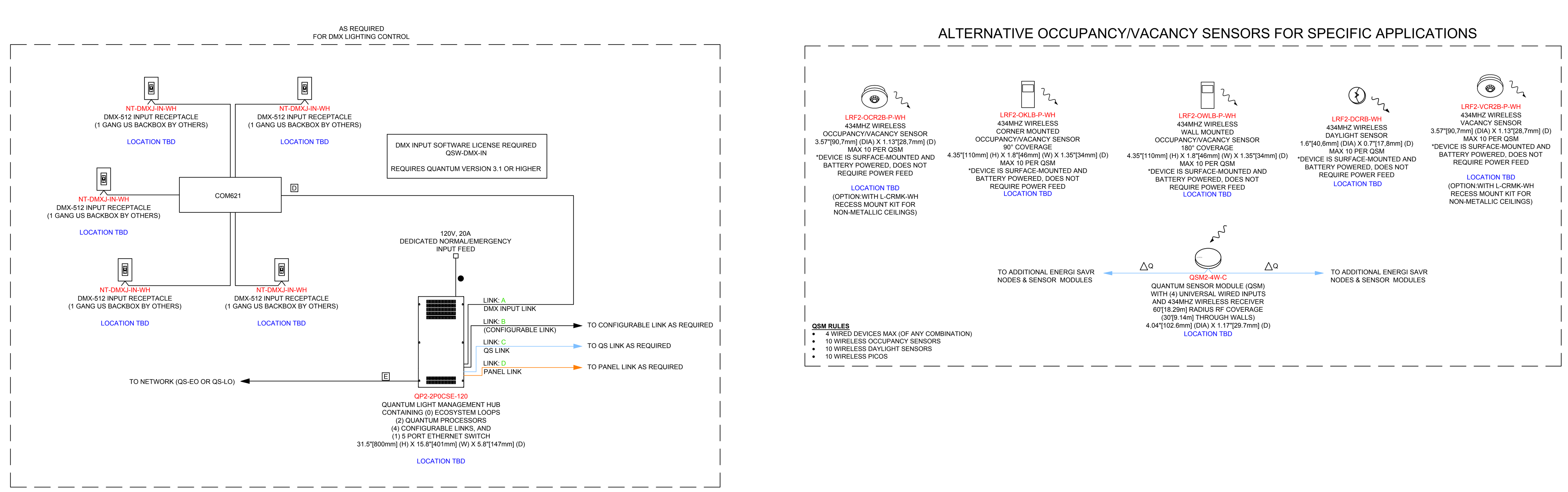

LUTRON NOTES:

ALL DIMMING BALLASTS TO BE LUTRON ECOSYSTEM, ECOSYSTEM H-SERIES, OR HI-LUME 3D TYPE. LUTRON DRIVER TO BE A-SERIES 3 WIRE UNLESS OTHERWISE NOTED.

E.E. TO CONFIRM ALL CIRCUITING REQUIREMENTS.

ARCHITECT TO VERIFY QUANTITY, LOCATION & FINISH OF ALL CONTROLS.

ALL FACEPLATES, DIMMERS, SWITCHES, RECEPTACLES & CABLE/PHONE JACKS TO BE LUTRON NOVA T*

LUTRON FIELD SERVICE COMMISSIONING INCLUDED IN ALL SYSTEMS INITIATES AN 2 YEAR LIMITED WARRANTY. THE ELECTRICAL CONTRACTOR MUST CONTACT LUTRON (800-523-9466) TO SET UP VISIT WITH 10 DAYS NOTICE.

WIRING LEGEND:

△Q QS CONTROL LINK (SEE WIRE DESCRIPTION BELOW)
▲Q QS CONTROL LINK (SEE WIRE DESCRIPTION BELOW) (CONNECT WIRES 1, 3 AND 4. DO NOT CONNECT WIRE # 2)

QS WIRING AS REQUIRED BY CONTROL LINK LENGTH (REFER TO QS SMART PANEL POWER SUPPLY WIRING GUIDE FOR SHADE WIRING NOTES):

TOTAL CONTROL LINK LENGTH	WIRE GUAGE	AVAILABLE FROM LUTRON IN ONE CABLE:
LESS THAN 500ft (153 m)	POWER (TERMINALS 1&2): 1 PAIR 18 AWG (1.0 mm²)	GRX-CBL-346S OR GRX-PCBL-346S
	DATA (TERMINALS 3&4): 1 PAIR 22 AWG (0.5 mm²), TWISTED AND SHIELDED*	
500ft (153 m) TO 2,000ft (600 m)**	POWER (TERMINALS 1&2): 1 PAIR 12 AWG (4 mm²)	GRX-CBL-46L OR GRX-PCBL-46L
	DATA (TERMINALS 3&4): 1 PAIR 22 AWG (0.5 mm²), TWISTED AND SHIELDED*	

*ALTERNATE DATA-ONLY CABLE: USE APPROVED DATA LINK CABLE (22 AWG [0.5 mm²] TWISTED/SHIELDED) FROM BELDEN (MODEL # 9461).

**TOTAL LENGTH OF THE QS LINK MUST NOT EXCEED 2,000 ft (600 m).

QS SMART PANEL POWER SUPPLY (QSPS-PX-10-60) QS WIRING GUIDE				
MAXIMUM DEVICES PER ONE OUTPUT		MAXIMUM DISTANCE PER ONE OUTPUT BASED ON WIRE GUAGE		
SHADES + CONTROLS		12 AWG (4 mm²) QSH-CBL-L-500 QSH-CBLP-L-500	16 AWG (1.5 mm²) QSH-CBL-M-500 QSH-CBLP-M-500	18 AWG (1.0 mm²) GRX-CBL-346S-500
NONE	UP TO 50 POWER DRAW UNITS	1,250 ft (375 m)	500 ft (150 m)	250 ft (75 m)
NONE	UP TO 25 POWER DRAW UNITS	2,000 ft (600 m)	1,000 ft (300 m)	600 ft (175 m)

QS INDIVIDUAL POWER SUPPLY (QSPS-PX-1-50 OR QSPS-J-1-50) QS WIRING GUIDE				
MAXIMUM DEVICES PER ONE OUTPUT		MAXIMUM DISTANCE PER ONE OUTPUT BASED ON WIRE GUAGE		
SHADES + CONTROLS		12 AWG (4 mm²) QSH-CBL-L-500 QSH-CBLP-L-500	16 AWG (1.5 mm²) QSH-CBL-M-500 QSH-CBLP-M-500	18 AWG (1.0 mm²) GRX-CBL-346S-500
NONE	UP TO 8 POWER DRAW UNITS	2,000 ft (600 m)		1,500 ft (450 m)

◁S

QS SMART PANEL POWER SUPPLY (QSPS-PX-10-60) SHADE WIRING GUIDE				
MAXIMUM DEVICES PER ONE OUTPUT		MAXIMUM DISTANCE PER ONE OUTPUT BASED ON WIRE GUAGE		
SHADES + CONTROLS		12 AWG (4 mm²) QSH-CBL-L-500 QSH-CBLP-L-500	16 AWG (1.5 mm²) QSH-CBL-M-500 QSH-CBLP-M-500	18 AWG (1.0 mm²) GRX-CBL-346S-500
1 SIVOIA QS SHADE OR DRAPERY	UP TO 1 POWER DRAW UNIT	500 ft (150 m)	200 ft (60 m)	125 ft (35 m)
2 SIVOIA QS ROLLER 64™, ≤ 30 ft² (2.75 m²) EACH		200 ft (60 m)	75 ft (20 m)	50 ft (15 m)
3 SIVOIA QS ROLLER 64™, ≤ 20 ft² (1.8 m²) EACH				
2 SIVOIA QS ROLLER 100™, ≤ 50 ft² (4.6 m²) EACH				

QS INDIVIDUAL POWER SUPPLY (QSPS-PX-1-50 OR QSPS-J-1-50) SHADE WIRING GUIDE				
MAXIMUM DEVICES PER ONE OUTPUT		MAXIMUM DISTANCE PER ONE OUTPUT BASED ON WIRE GUAGE		
SHADES + CONTROLS		12 AWG (4 mm²) QSH-CBL-L-500 QSH-CBLP-L-500	16 AWG (1.5 mm²) QSH-CBL-M-500 QSH-CBLP-M-500	18 AWG (1.0 mm²) GRX-CBL-346S-500
1 SIVOIA QS SHADE OR DRAPERY	UP TO 1 POWER DRAW UNIT	250 ft (75 m)	100 ft (30 m)	50 ft (15 m)

- INPUT POWER (NORMAL-EMERGENCY)
- INPUT POWER (NORMAL)
- ● 2 #12AWG (4 mm²)
- ○ 3 #12AWG (4 mm²)
- ◆ 0-10V SIGNAL: 2 #18AWG (1.0 mm²)
- ◇ ECOSYSTEM BUS/LOOP: LUTRON CABLE C-CBL-216-GR-1 (2 #16 CONDUCTOR NON-PLENUM) OR C-PCBL-216-CL-1 (2 #16 CONDUCTOR PLENUM RATED). OTHERWISE USE 2 #16 AWG (1.5 mm²) BY OTHERS.
- E CAT5E OR BETTER CABLE FOR LUTRON NETWORK TERMINATED WITH RJ45 CONNECTORS (TO BE PROVIDED BY OTHERS). 328 ft (100 m) MAXIMUM RUN.
- ▽P PANEL LINK (SEE WIRE DESCRIPTION BELOW)
- ▼P PANEL LINK (SEE WIRE DESCRIPTION BELOW) (CONNECT WIRES 1, 2, 3 AND 4. DO NOT CONNECT WIRE # 5)

  LUTRON CABLE GRX-CBL-46L (5 CONDUCTOR NON-PLENUM) OR GRX-PCBL-46L (5 CONDUCTOR PLENUM RATED). OTHERWISE USE 2 #12 AWG (4 mm²), 1 BELDEN #9461 AND BETWEEN PANELS ADD 1 #18 AWG (1.0 mm²) FOR EMERGENCY SENSING CABLE BY OTHERS.
- F FIBER OPTIC CABLE FOR LUTRON NETWORK TERMINATED WITH APPROPRIATE FIBER OPTIC CONNECTORS (TO BE PROVIDED BY OTHERS). NOTE: REQUIRES DEDICATED FIBER OPTIC LINK (SINGLE-MODE OR MULTI-MODE).
- 1-WAY RF COMMUNICATION
- 2-WAY RF COMMUNICATION
- ●● 2 #18AWG (1.0 mm²)
- ∞ 3 #18AWG (1.0 mm²)
- LUTRON SENSOR CABLE C-CBL-522S OTHERWISE USE 3 #22 AWG (1.0 mm²)
- LUTRON SENSOR CABLE C-CBL-522S OTHERWISE USE 4 #22 AWG (1.0 mm²)
- D DMX CONTROL
- DALI LINK

CONCEPT DRAWING NOTES:
CONTROL SYSTEM DRAWING IS PROVIDED FOR CONCEPTUAL PURPOSES ONLY AND IS NOT INTENDED FOR CONSTRUCTION. EXACT EQUIPMENT REQUIREMENTS, INCLUDING LOCATIONS AND QUANTITIES, SHOULD BE VERIFIED IN ACCORDANCE WITH THE MOST UP-TO-DATE LIGHTING/ELECTRICAL REFLECTED CEILING PLANS, LIGHTING FIXTURE SCHEDULES, PANEL SCHEDULES, CONTROL INTENT AND SPECIFICATIONS. SHADE EQUIPMENT SHOULD BE VERIFIED IN ACCORDANCE WITH ARCHITECTURAL PLANS, SPECIFICATIONS AND WINDOW SCHEDULES/DETAILS.

LED DIMMING REQUIRES AN EXACT MATCH BETWEEN THE LED ARRAY, DRIVER AND CONTROL. LUTRON CANNOT GUARANTEE COMPATIBILITY OR PERFORMANCE WITHOUT TESTING THIS COMBINATION.

TO CONFIRM WHAT PRODUCTS LUTRON HAS AVAILABLE OR WHAT INTERFACES MAY BE REQUIRED, CALL 1-877-DIM-LED8 OR CHECK LUTRON'S PRODUCT COMPATIBILITY MATRIX ON-LINE AT WWW.LUTRON.COM/LED.

TO REQUEST THE TESTING OF AN LED PRODUCT BY LUTRON MANUFACTURERS CAN FILL OUT AN LED EVALUATION REQUEST FORM ON-LINE AT WWW.LUTRON.COM/LED OR CONTACT LEDS@LUTRON.COM.

LUTRON CAN GUARANTEE COMPATIBILITY AND PERFORMANCE OF LUTRON HI-LUME A-SERIES LED DRIVERS USED WITH APPROPRIATE LUTRON CONTROLS. THE HI-LUME A-SERIES LED DRIVER CAN BE USED ON PRODUCTS UNDER 40 WATTS WITH SUITABLE MOUNTING LOCATIONS. PLEASE REFER TO THE SPECIFICATION SUBMITTAL SHEET FOR FURTHER INFORMATION.

IF USING UNTESTED, NON-LUTRON LED DRIVERS REQUIRING 0-10V CONTROL, PERFORMANCE AND COMPATIBILITY CANNOT BE GUARANTEED BY LUTRON. PRODUCTS FOLLOWING THE IEC STANDARD 60929 ARE MORE LIKELY TO PROVIDE ACCEPTABLE PERFORMANCE RESULTS. DETERMINATION OF RESULT ACCEPTABILITY IS UP TO THE USER'S DISCRETION.

IF USING UNTESTED, NON-LUTRON LED DRIVERS REQUIRING PHASE CONTROL, PERFORMANCE AND COMPATIBILITY CANNOT BE GUARANTEED BY LUTRON. A-SERIES OR ELV PRODUCTS PROVIDING HIGH END AND LOW END TRIM ADJUSTMENTS ARE MORE LIKELY TO PROVIDE ACCEPTABLE PERFORMANCE RESULTS. DETERMINATION OF RESULT ACCEPTABILITY IS UP TO THE USER'S DISCRETION.

WIRING NOTES:

QS LINK RULES

THE FOLLOWING LINK RULES MUST BE OBSERVED FOR PROPER OPERATION:

- THIS IS A TOPOLOGY-FREE LINK (T-TAP, HOME-RUN, ETC. IS OK); REFER TO TABLE BELOW FOR WIRE RUN LIMITS.
- IF WIRED DIFFERENTLY THAN WHAT IS SHOWN, POWER DRAW UNIT REQUIREMENTS NEED TO BE CONFIRMED; SEE POWER DRAW UNITS (PDUs) SPECIFICATION SHEET INCLUDED IN THIS SUBMITTAL.
- MAXIMUM OF 512 OUTPUTS (BALLASTS, SHADES, CONTACT CLOSURES, ETC).
- MAXIMUM OF 100 OCCUPANCY SENSORS, 100 DAYLIGHT SENSORS/RADIO SHADOW SENSORS AND 100 KEYPADS.
- MAXIMUM OF 100 QS DEVICES (SUCH AS A GRAFIK EYE® QS, SEETOUCH® QS KEYPAD, SMART PANEL POWER SUPPLY [QSPS-Px-10-60], ESN, OR SIVOIA® QS SHADE / DRAPERY DRIVE UNIT). QUANTUM PROCESSOR COUNTS AS 1 DEVICE PER LINK.
- MAXIMUM OF 100 ZONES - SUCH AS A SIVOIA QS SHADE / DRAPERY DRIVE UNIT, OR A LIGHTING ZONE ON A GRAFIK EYE QS (DOES NOT APPLY TO QUANTUM SYSTEMS).
- THE 10 OUTPUTS ON A QSPS-Px-10-60 CANNOT EXCEED A COMBINED LENGTH OF 2,000 ft (600 m).

PANEL LINK RULES

PANEL(S) BASED ON ____________ DATED XX.XX.XX FROM ____________

THE FOLLOWING LINK RULES MUST BE OBSERVED FOR PROPER OPERATION:

- PANELS ARE DAISY-CHAINED ON ONE OF THE CONFIGURABLE LINKS PER LUTRON'S DRAWING, HOWEVER THEY DO NOT HAVE TO BE IN THE ORDER SHOWN.
- DO NOT HOME-RUN OR T-TAP THIS WIRING LINK. ALL CIRCUITS NEED TO BE LANDED IN THESE PANELS PER LUTRON'S PANEL SCHEDULES.
- THE MAXIMUM WIRE LENGTH OF A PANEL LINK IS 2,000 ft (600 m). A MX-RPTR IS USED TO EXTEND THE LENGTH OF A LINK ANOTHER 2,000 ft (600 m). A MAXIMUM OF (3) MX-RPTR'S MAY BE USED PER LINK FOR MAXIMUM LENGTH OF 8,000 ft (2,430 m) PER LINK.
- IF A PANEL IS MOVED TO ANOTHER LINK, OR THE LOADS ARE NOT WIRED AS SHOWN IN LUTRON PANEL SCHEDULES, LUTRON MUST BE NOTIFIED. THIS INFORMATION IS IMPORTANT FOR PROGRAMMING THE SYSTEM.
- UP TO 32 CIRCUIT SELECTORS PER LINK
- UP TO 512 SWITCH LEGS OR ZONES PER LINK
- LT-1 LINK TERMINATORS NEEDED ON EACH END OF THE LINK

ECOSYSTEM BUS/LOOP RULES

THE FOLLOWING LOOP RULES MUST BE OBSERVED FOR PROPER OPERATION:

- THIS IS TOPOLOGY-FREE AND POLARITY FREE WIRING (T-TAP, HOME-RUN, ETC. IS OK).
- KEEP ALL THE BALLASTS/MODULES IN ONE ROOM ON THE SAME LOOP WHENEVER POSSIBLE.
- WIRE DAYLIGHT SENSORS, OCCUPANCY SENSORS AND PERSONAL CONTROLS TO THE CLOSEST ECOSYSTEM BALLAST/SENSOR MODULE IN THE SAME ROOM.
- ECOSYSTEM LOOPS ARE SHOWN ON THE LIGHTING PLANS. IF THERE IS A DISCREPANCY, AND ROOMS ARE WIRED TO A DIFFERENT LOOP THAN THE ONE SHOWN, LUTRON NEEDS TO BE NOTIFIED. THIS INFORMATION IS IMPORATANT FOR PROGRAMMING THE SYSTEM.
- UP TO 65 BALLASTS/MODULES PER ECOSYSTEM LOOP
- UP TO 64 IR CONTROLS PER LOOP
- UP TO 16 DAYLIGHT SENSORS PER LOOP
- UP TO 32 OCCUPANT SENSORS PER LOOP

QUANTUM NETWORK

WHEN A LIGHTING MANAGEMENT NETWORK (LMN) IS REQUIRED TO ENABLE COMMUNICATIONS BETWEEN INDIVIDUAL LIGHT MANAGEMENT HUBS (LMH) AND BETWEEN LMH AND THE SYSTEM SERVER/DESKTOP/LAPTOP (Q-MANAGER). THE LMN REQUIRES A DEDICATED LAN OR VLAN. IT IS THE RESPONSIBILITY OF THE NETWORK PROVIDER TO ENSURE THE RELIABILITY AND SECURITY OF THE LMN.

CAT5E OR BETTER ETHERNET CABLE TO BE RUN FOR DEDICATED LMN TERMINATED WITH RJ45 CONNECTORS (PROVIDED BY OTHERS). THE NUMBER OF ETHERNET HOPS/SEGMENTS BETWEEN THE SERVER/DESKTOP/LAPTOP (Q-MANAGER) AND ANY LMN NODE SHALL NOT EXCEED 6. TOTAL LENGTH OF ETHERNET CABLE SHALL NOT EXCEED 328 FT (100M) POINT-TO-POINT.

IF LONGER RUNS ARE REQUIRED, MULTI-MODE FIBER OPTIC CABLE CAN BE USED INSTEAD WITH APPROPRIATE FIBER OPTIC CONNECTORS (PROVIDED BY OTHERS). CONSULT WITH NETWORK PROVIDER FOR STANDARD ETHERNET AND FIBER OPTIC WIRING RULES FOR DISTANCE AND SEPARATION AS WELL AS FOR PLACEMENT OF SWITCHES, ROUTERS, HUBS, ETC.

FOR MORE INFORMATION REGARDING NETWORK EQUIPMENT REQUIREMENTS AND NETWORK CONFIGURATION, PLEASE REFER TO THE QUANTUM LIGHTING MANAGEMENT NETWORK SPECIFICATION SHEET OR CONTACT LUTRON.

SERVICE TITLE (LINE ITEM)	SERVICE DESCRIPTION
SERVICES BELOW ARE TO BE INCLUDED AS PART OF THIS PROJECT'S SCOPE OF WORK AND SPECIFIED INTO THE WRITTEN SPEC DOCUMENTS.	
PRE-STARTUP SERVICES	
SYSTEM & NETWORK INTEGRATION CONSULTATION (LSC-INT-VISIT)	INTEGRATION CONSULTATION FOR 3RD PARTY EQUIPMENT (e.g. BUILDING AUTOMATION SYSTEMS, ENERGY DASHBOARDS, NON-LUTRON SHADES, IT NETWORK).
SENSOR LAYOUT & TUNING (LSC-SENS-LT)	LUTRON TO PROVIDE FINAL DESIGN LAYOUT AND FINE-TUNING CALIBRATION OF OCCUPANCY AND DAYLIGHT SENSORS.
STARTUP SERVICES (THESE SERVICES ARE ADDITIONAL TO YOUR SPECIFIED STARTUP BASED ON YOUR REQUIREMENTS)	
AFTER HOURS STARTUP (LSC-AH-SU)	ONSITE STARTUP TO TAKE PLACE OUTSIDE OF NORMAL LUTRON BUSINESS HOURS (8:00 AM-5:00 PM, MON-FRI)
SYSTEM PERFORMANCE VERIFICATION DOCUMENTATION (LSC-SPV-DOC)	SATISFIES DOCUMENTATION REQUIRED FOR SYSTEM PERFORMANCE-VERIFICATION, INCLUDING LEED.
ONSITE PERFORMANCE VERIFICATION WALKTHROUGH (LSC-WALK)	LUTRON FIELD SERVICE ONSITE WALKTHROUGH TO DEMONSTRATE THE LUTRON SYSTEM FUNCTIONALITY TO A FACILITY REPRESENTATIVE (e.g. COMMISSIONING AGENT OR LEED CONSULTANT).
ONSITE SCENE & LEVEL TUNING (LSC-AF-VISIT)	LUTRON FIELD SERVICE ONSITE VISIT WITH THE LIGHTING DESIGNER TO VERIFY PERFORMANCE AND MAKE REAL-TIME ADJUSTMENTS.
CUSTOMER SITE SOLUTION TRAINING (LSC-TRAINING)	ADDITIONAL TRAINING WITH FACILITY STAFF ON SYSTEM FEATURES AND FUNCTIONALITY.
SYSTEM OPTIMIZATION (LSC-SYSOPT)	LUTRON FIELD SERVICE TO REVISIT THE FACILITY TO OPTIMIZE AND ENSURE SUSTAINABLE PERFORMANCE AND MAXIMIZE ENERGY SAVINGS BY ADJUSTING SETTINGS AND PROGRAMMING. RECOMMEND SCHEDULING 6-12 MONTHS AFTER STARTUP.
MAINTENANCE & SUPPORT SERVICES	
SOFTWARE MAINTENANCE AGREEMENT (LSC-SMA)	LUTRON TO PROVIDE COMPATIBILITY TESTING FOR SERVER AND BROWSER PATCH UPDATES AND UNLIMITED NO-CHARGE QUANTUM® LICENSE UPGRADES FOR THE DURATION OF THE TERM THE SOFTWARE MAINTENANCE AGREEMENT IS IN EFFECT.
SILVER ENHANCED WARRANTY (LSC-E8S)	FIRST 2 YEARS: 100% PARTS/DIAGNOSTIC LABOR COVERAGE AS PROVIDED UNDER THE COMMERCIAL SYSTEMS LIMITED WARRANTY, WITH FIRST AVAILABLE RESPONSE TIME. YEARS 3-8: PRO-RATED PARTS ONLY COVERAGE.
GOLD ENHANCED WARRANTY (LSC-E8G)	FIRST 2 YEARS: 100% PARTS/DIAGNOSTIC LABOR COVERAGE AS PROVIDED UNDER THE COMMERCIAL SYSTEMS LIMITED WARRANTY; **72-HOUR ONSITE/REMOTE RESPONSE TIME**; ONE ANNUAL **PREVENTIVE MAINTENANCE** VISIT. YEARS 3-8: PRO-RATED PARTS ONLY COVERAGE.
PLATINUM ENHANCED WARRANTY (LSC-E8P)	FIRST 2 YEARS: 100% PARTS/DIAGNOSTIC LABOR COVERAGE AS PROVIDED UNDER THE COMMERCIAL SYSTEMS LIMITED WARRANTY; **24-HR ONSITE/REMOTE RESPONSE TIME**; ONE ANNUAL **PREVENTIVE MAINTENANCE** VISIT. YEARS 3-8: PRO-RATED PARTS ONLY COVERAGE.
PLEASE GO TO WWW.LUTRON.COM/SERVICES FOR FURTHER INFORMATION.	

QUANTUM TYPICAL ONELINE

CONCEPT DRAWING NOT FOR CONSTRUCTION

Project Number:	#######
Drawn By:	XXX
Drawing Revision:	0
Drawing Date:	OCTOBER 2016
Sheet:	1 of 1

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