BOE QA/QC FORMS

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QA/QC CHECK LIST

Project Name: **Project #**

Phase %:

Reviewer **Date:**

A. ENGINEERING - GENERAL	50%*	90%*	REFERENCE DOCUMENTS** Specification / Drawing / Memorandum
1. The concept detailed on the plans and described in the specifications conforms to the intent established by the project authorization documents, the Pre-Design Report and up-to-date Design Memorandum.	X		
2. Design assumptions are reasonable.	X		
3. Design calculations are correct and complete.	X		
4. Plant design life	X		
5. Level of redundancy and reliability	X		
6. Process license and secrecy agreements	X		
7. The required real estate and easements are adequately identified.	X		
8. Land survey information, geotechnical considerations, utilities and site conditions have been adequately and properly incorporated.		X	
9. Site access limits for equipment or material	X		
10. The location of the same equipment and features shown on different drawings (same or different discipline) is the same on each.		X	
11. The locations and features of the structures, substructures, equipment, fixtures, piping, conduits, ducts, building members, building appurtenances and utilities are coordinated such that there are no physical conflicts that could prevent their installation or proper use. There is adequate access to all equipment and fixtures that must be operated and maintained.	X		
12. Verification of substructures and underground utilities which may cause interference. (Potholing Report)	X		
13. Information shown on the plans and provided in the specifications is presented clearly, consistently and accurately.		X	
14. All abbreviations and symbol lists are complete and accurate.		X	
15. Drawing details and sections are appropriate, complete and accurate, and are correctly cross-referenced to each other and to the plan views. Coordinated relationships, uniformity and continuity are maintained among all details.		X	
16. Continuity is carried from one drawing to		X	

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QA/QC CHECK LIST

Project Name: **Project #**
Phase %:

Reviewer **Date:**

A. ENGINEERING - GENERAL	50%*	90%*	REFERENCE DOCUMENTS** Specification / Drawing / Memorandum
another.			
17. Plans are complete and organized in a logical arrangement that makes the project easily understood.		X	
18. Plan sheets and details are coordinated within and among disciplines.		X	
19. Technical specifications are included for all required items.		X	
20. Plans and specifications are consistent and coordinated.		X	
21. Equipment maintenance access re-quirements: platforms, headroom, etc.		X	
22. Soils report (Geotech) to locate areas of contaminated soils and underground structures for demolition and/or removal		X	
23. Demolition requirements including restitution of CITY property, disposing or storing of grant funded equipment	X		
24. Clearance for removal of equipment and/or required internal parts, e.g., heat exchanger tube bundles, rotors, shafts, doors, etc.	X		
25. Previous review comments have been addressed and appropriately incorporated, and the logs have been annotated.		X	
26. Governing codes and standards.	X		
27. Air emission requirements and AQMD permits	X		
28. External/internal noise report	X		
29. Coastal Development Permit requirements have been incorporated, if applicable.	X		
30. Environmental (EIR) regulation compliance and to comply with mediating requirements	X		
31. Special startup conditions, operation at partial loads, temporary steam supply, etc.		X	
32. Building & Safety and all other permitting agency requirements have been satisfied and incorporated.		X	
33. L.A. Fire Department review, and safety building and electrical classification		X	
34. Cultural Affairs Commission requirements have been incorporated.		X	
35. UL label requirements, including packaged equipment		X	
36. Equipment and piping identification numbers		X	
37. All materials specified or allowed by the		X	

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A. ENGINEERING - GENERAL	50%*	90%*	REFERENCE DOCUMENTS** Specification / Drawing / Memorandum
contract documents are approved by the City of Los Angeles Department of Building & Safety. Research report numbers and expiration dates are properly shown in the plans and specifications, as applicable.			
38. Reasons for selecting specific types of materials and equipment have been addressed in the Design Memorandum.	X		
39. The phrase "or equal" is appropriately used.		X	
40. Piping color coding		X	
41. Special concrete coatings or sealers		X	
42. Seismic requirements per latest L.A. building code		X	
43. Utility stations: air, water, steam, other		X	
44. Cranes and hoists for maintenance		X	
45. Shop inspection a. Coordinated with CON-AD materials supervisor (J. Aceves). b. Details of inspection travel and subsistence.		X	
46. Specific training requirements - number of people, duration, etc.		X	
47. Number of O&M manuals to be submitted		X	
48. Project model: 3-D CADD and/or scale model		X	
49. Signs: NO SMOKING, EXIT, DO NOT ENTER, etc.		X	
50. Inspection plan for procurement items (budget/payment plan, shop inspection, etc.)		X	
51. Considered Americans with Disabilities Act (ADA) and handicapped access	X		
52. Schedule for payment of procurement items		X	
53. Estimates: a. Class A b. Class AB c. Class B d. Class C		X	
54. Specifications: a. Established list of Sections b. Obtained copies of Master Specification	X		
55. Considered Value Engineering: a. 10% design b. 50% design	X		

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A. ENGINEERING - GENERAL	50%*	90%*	REFERENCE DOCUMENTS** Specification / Drawing / Memorandum
56. Considered Constructability Review: a. 50% design b. 90% design	X		
57. Process sampling taps		X	
58. SCAQMD testing cost covered in specifications		X	
59. Piping: Demolished/abandoned: capped at nearest point serving header	X		
60. At 50% design level, identified and prepared a list of sole source equipment, devices, components, etc., for Division Engineer's concurrence	X		
61. Prepared Board Report for sole soured equipment	X		
62. Restrictions, procedures, means and methods provided for in the plans and specifications are reasonable and necessary.		X	
63. For Insurance requirement contact the Risk Management Section for proper coverage's.		X	
64. When odor control process connections are being considered for deletion, the AQMG shall be notified, to develop alternate course of action.	X		
65. Specified that the odor control system needs to be balanced by a certified balancing co.	X		
66. Plans have been properly signed and sealed by the Consultant, when applicable, and by the Division Engineer. (This item applies only to the review at the Design Completion milestone.)		X	

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QA/QC CHECK LIST

Project Name: **Project #**
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Reviewer **Date:**

B. MATERIAL HANDLING	50%*	90%*	REFERENCE DOCUMENTS** Specification / Drawing / Memorandum
1. Design Criteria	X		
2. Type of materials handled	X		
3. Characteristics of materials handled	X		
a. Percent moisture content	X		
b. Hardness (Mohs scale)	X		
c. Angle of repose	X		
d. Angle of surcharge	X		
e. Abrasiveness	X		
f. Material particle size	X		
g. Density (lb/ft^2)	X		
h. Chemical composition	X		
I. Hazardous materials/classification	X		
j. Safety precautions for handling hazardous materials	X		
k. Explosive characteristics	X		
4. Special handling or storage for chemicals	X		
5. Heat tracing/winterizing: steam, electric, glycol	X		
6. Maintenance philosophy: repair in place or remove, repair, and replace	X		
7. Minimum width operating walkways and maintenance platforms	X		
8. Slab/containment design for chemical storage areas, specified Type K cement	X		
9. Fire and explosion protection plan	X		

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Project Name: **Project #**
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Reviewer **Date:**

C. MATERIALS OF CONSTRUCTION	50%*	90%*	REFERENCE DOCUMENTS** Specification / Drawing / Memorandum
1. Material selection vs. equipment life		X	
2. Critical areas - design temperature and design pressure	X		
3. Sour gas services (NACE MR-01-75)	X		
4. Establish stress relieving criteria	X		
5. Heat affected zones	X		
6. General service: a. Design conditions. b. Upset conditions.	X		
7. Corrosion allowance for equipment and piping	X		
8. Caustic service: a. Special piping b. Consideration for acid, caustic transport	X		
9. Prohibited materials (asbestos, PCB's, mercury, etc.)		X	
10. Coating color selection: 3 coat paint system & piping color code.		X	
11. Hot dip galvanizing vs. coatings for structural steel, platforms, tanks; prepare corrosion protection plan	X		
12. Verified design criteria for digester gas piping requirements	X		
13. Welding and fabrication: a. Welding qualification b. Welding code: ANSI B31.3 c. Clad and overlay - reference d. One or two layers - thickness e. Post heat treatment f. Inspection: NDE above and beyond code g. Definition of allowable major & minor repairs	X		
14. Fireproofing materials	X		
15. Insulation: a. Criteria on energy conservation economics b. Personal protection	X		
16. Outdoor/indoor type insulation requirements	X		
17. Thermal expansion consideration, including	X		

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QA/QC CHECK LIST

Project Name: **Project #**
Phase %:

Reviewer **Date:**

C. MATERIALS OF CONSTRUCTION	50%*	90%*	REFERENCE DOCUMENTS** Specification / Drawing / Memorandum
expansion joints			
18. Aluminum handrails/ladders	X		
19. Aluminum/galvanized/non-metallic grating	X		
20. Special consideration for marine environment	X		
21. Special considerations for sewers and drain lines with regards to acid and caustic discharges		X	
22. Tanks for Sodium Hypochlorite less than 5.000 gallons used Polyethylene, greater than 5,000 gallons specified fiberglass with proper resin and good quality control fabrication.	X		

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QA/QC CHECK LIST

Project Name: **Project #**
Phase %:

Reviewer **Date:**

D. PIPING	50%*	90%*	REFERENCE DOCUMENTS** Specification / Drawing / Memorandum
1. Verify "System" Flow Schematic/Flow Diagram/P&ID has been developed with the process technology identified.	X	X	
2. Verify System/Process Description has been written.	X	X	
3. Verify design criteria for any fluid pipe system has been established and well defined.	X	X	
4. Indicate applicable codes (ANSI B31.1, ANSI B31.3, ANSI B31.8, ASME Boiler Code, etc.).	X	X	
5. Verify all rotating and non-rotating equipment including automatic valves have been arranged for maintenance work.		X	
6. Verify Bill of Materials has been included with set of drawings.		X	
7. Verify field survey of existing underground piping and electrical conduits/duct banks has been conducted.		X	
8. Verify all process and utility piping have been preferably located above ground.		X	
9. Verify slope of fluid lines have been shown on the drawings.		X	
10. Verify acid and hazardous chemical lines have been double contained or adequately shielded.		X	
11. Verify fluid lines through walls are fitted with appropriate sleeves, and are designed with due fire rating considerations.		X	
12. Verify sufficient overhead clearance exists: e.g., 16 feet over roadways (check with Fire Department), 6 feet over walkways, etc..		X	
13. Verify pipe bridges include 15% to 20% clear space for future expansion.		X	
14. Verify pipe flexibility has been considered over use of expansion joints.	X	X	

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QA/QC CHECK LIST

Project Name: **Project #**
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Reviewer **Date:**

15. Verify pipe vents to atmosphere are at safe elevation and not less than 10 feet above operating level.		X	
16. Verify vents and drains containing toxic or hazardous products are adequately routed and contained.		X	
17. Verify pipe supports, anchors, guides, restraints, etc., are indicated on piping plans and isometrics.		X	
18. Verify pipe sizes 2½-inch, 3½-inch, 5-inch have been avoided unless required by vendor.		X	
19. Verify minimum size connections for process and utility lines are ¾ inches.		X	
20. Verify long radius weld elbows have been used over short radius elbows unless circumstances require otherwise.		X	
21. Verify 150-pound class flanges connecting to equipment with cast iron 125-pound class are flat face with full gaskets.		X	
22. Verify chain wheels are provided for all valves located over 6 feet above operating level.		X	
23. Verify all valve stations are accessible from grade, walkway, or platform for operations and maintenance.		X	
24. Verify hydrotest vents or drains are fitted with two valves.		X	
25. Verify ladders and platforms conform to OSHA requirements (e.g., provide cage for ladders taller than 10-15 feet).		X	
26. Verify platforms at maintenance openings are large enough to satisfy minimum space required to swing open minimum of 120°.		X	
27. Verify davits are provided on all vessels where maintenance opening covers are not accessible with a crane.		X	
28. Verify maintenance openings are oriented away from structural columns and members.		X	
29. Verify drain valves are provided at low points of process and utility lines.		X	

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Project Name: **Project #**
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Reviewer **Date:**

30. Verify branch lines from the steam header connect to top of the header.		X	
31. Verify consideration has been given to installation of blinds for maintenance.		X	
32. Verify containment dikes have not been breached by piping. Show method/means to remove rainwater, washdown water, etc.		X	
33. Verify seismic/thermal stress analysis has been conducted.		X	
34. Verify piping color-coding has been indicated.		X	
35. Verify float type traps are not used except on steam and clean services.		X	
36. Verify all dampers and accumulators contain a diaphragm to separate air from liquid.		X	
37. Verify no pipes have been routed to storm drain openings.		X	
38. Verify secondary containment for overhead chemical lines and use of Type K cement have been considered.		X	
39. Verify any abandoned and demolished pipe has been capped at nearest point serving the header.		X	
40. Verify any buried valve installation uses valve vaults, not valve caps.		X	
41. Verify stress analysis of steam lines has been conducted.		X	
42. Verify warm-up lines/drains have been provided for steam lines.	X	X	
43. Coordinate with architectural/civil/structural and electrical disciplines in order to avoid interference between pipe and structural members and electrical cabinets, conduits, cable trays, etc..	X	X	
44. Verify new design does not interfere with existing electrical equipment, pipes, hangers, columns, beams, etc..	X	X	
45. Verify that all control valves have isolation valves and a bypass, unless there is a reason not to.	X	X	

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Phase %:

Reviewer **Date:**

E. MECHANICAL	50%*	90%*	REFERENCE DOCUMENTS** Specification / Drawing / Memorandum
1. Verify "System" Flow Schematic/Flow Diagram/P&ID has been developed with the process technology identified.	X	X	
2. Verify System/Process Description has been written.	X	X	
3. Verify System and equipment and component design criteria have been established.	X	X	
4. Verify all design disciplines are using the General Arrangement (GA) drawings as reference drawings.	X	X	
5. Identify System/Equipment design conditions: a. Startup. b. Normal, minimum, maximum. c. Upset.	X	X	
6. Verify and list vent, drain, steamout, flushing, and purging requirements.		X	
7. Verify source of utility systems and identify design & operating conditions.	X	X	
8. Identify battery limit conditions.		X	
9. Identify tie-in locations and tie-in list.		X	
10. Verify hot tapping has been avoided if possible.		X	
11. Verify CITY furnished procurement packages (scope of work) are delineated on P&IDs and plans.		X	
12. Verify pressure-relief devices' sizing criteria have been established.	X	X	
13. Provide emergency shutdown criteria.	X	X	
14. Verify startup, shutdown, purging, and steamout acceptance criteria have been identified.	X	X	
15. Verify procedures for steam blow and pickling of pipelines and equipment have been written.		X	
16. Verify temporary additional pipe supports for steam blows have been designed.		X	
17. Verify procedures for acid cleaning/layup of standby equipment have been written.	X	X	

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E. MECHANICAL	50%*	90%*	REFERENCE DOCUMENTS** Specification / Drawing / Memorandum
18. Determine if temporary strainers are required.		X	
19. For mechanical utilities, indicate:		X	
a. HVAC air changes	X	X	
b. HVAC duct air velocities	X	X	
c. HVAC interface with fire protection: e.g., halon system, etc.	X	X	
d. Internal equipment heat loads	X	X	
e. Life support systems, i.e., breathing air, oxygen		X	
f. Special dust & fume control	X	X	
20. Indicate sound abatement requirements.		X	
21. Provide fire protection system criteria & evacuation plan.			
22. Determine if potable-water backflow preventers and/or air gaps are a regulatory requirement for the process/system.	X	X	
23. Verify if any remote lubrication systems are needed.		X	
24. Indicate vibration criteria for rotating and reciprocating machines.		X	
25. Determine if Department of Building and Safety Mechanical Plan Check is required.		X	
26. Indicate and detail any Equipment insulation.		X	
27. Indicate any shop inspection requirements.		X	
28. Verify buried valves are located in accessible vaults.		X	
29. Verify gate valves contain rising stems.		X	
30. Verify floor drains contain P-traps and a primer.		X	
31. Verify equally manufactured products have been listed.		X	
32. Verify materials have been correctly selected		X	

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E. MECHANICAL	50%*	90%*	REFERENCE DOCUMENTS** Specification / Drawing / Memorandum
for the fluid/substance to be handled.			
33. Verify air scrubber system design criteria has been established.	X	X	
34. Verify chain wheel valve operators are provided for valves higher than 6'-6" above maintenance elevation.		X	
35. Verify the caps and nuts for fire hydrants fit the standard three-hole L.A. Fire Department wrench.		X	
36. Verify gate valves used on freshwater, fire protection water, and industrial water systems have rising stems and are installed in valve vaults.	X	X	
37. Verify all mechanical systems (HVAC equipment and ducting, pumps and fans, fire protection, piping, plumbing, etc.) have been designed and laid-out by coordinating with civil/structural/architectural personnel and with electrical engineering personnel who have laid-out the cabinets, electrical cable trays, conduit, etc.	X	X	

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F. ARCHITECTURAL	50%*	90%*	REFERENCE DOCUMENTS** Specification / Drawing / Memorandum
1. Compliance with project requirements	X		
2. Compliance with architectural criteria and standards	X		
3. Compliance with applicable codes	X		
4. Drawings complete and correct		X	
5. Coordination of specifications and drawings		X	
6. Verify cross-referencing		X	
7. Coordination with other disciplines, squad checks		X	
8. General Notes		X	
9. Determination of building type & occupancy	X		
10. Architectural review board (Cultural Affairs Commission) filing		X	
11. Material, products and finishes requirements		X	
12. Fire protection requirements		X	
13. Schedules for doors & windows		X	
14. Required specifications Divisions 4, 5, 6, 7, 8, 9 & 10 checklist and other applicable Section		X	
15. Handicapped requirements - comply with the American Disabilities Act	X		
16. Demolition requirements	X		
17. Signs - No Smoking, Exit, Do Not Enter, etc.	X		
18. Building & Safety plan check filing		X	
19. Door sizes verified with other disciplines - large cabinets/equipment	X		
20. Designated area for trash bins and/or recycle bins and hazardous waste	X		
21. Sandblasting prohibited		X	
22. When start a Building Design, contact the Cultural Affairs Commission Design Advisory panel (CDAP) Mr. Haroot Aranesian at (213) 425-2499 to identify possible problems	X		

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G. CIVIL	50%*	90% *	REFERENCE DOCUMENTS** Specification / Drawing / Memorandum
1. GENERAL:			
a. Verify compliance with project requirements. Reference specific requirements (which document?) and list drawing(s) that address the requirements.	X	X	
b. Check compliance with applicable codes. Reference specific codes and list drawing(s) that address the code requirements.	X	X	
c. Check coordination of specifications, calculations and drawing(s). List specific calculations and drawing(s) that have been checked.	X	X	
d. Verify cross-referencing. List drawing(s) that have been checked.	X	X	
e. Verify consistency with other disciplines, squad checks. List corresponding drawing(s)		X	
f. Include specification Division 2 checklist. State location of checklist		X	
g. Building & Safety plan check required. What is the plan check stub number?		X	
h. Verify that the index of drawing(s) on the covers sheet is correct and matches the plans. List drawing(s) that have been checked		X	.
i. Verify that the abbreviations used on the drawing(s) are correct as shown on the Drawing Legends. List drawing(s) that have been checked.		X	
2. CONTRACTOR ACCESS AND AREAS:			
a. Show contractor laydown area. Which drawing(s) show this?	X	X	
b. Show access to the site. Which drawing(s) show this?	X		
3. EXISTING SITE CONDITIONS:			
a. Field verify existing site conditions from survey notes and check plans for consistency. List drawing(s), which have been checked.	X	X	
b. Verify that all existing utilities are shown in the plans. List applicable drawing(s)	X	X	
c. Indicate existing elevations by writing (Existing) in parenthesis. List drawings.	X	X	
d. Surveys – obtain latest copy from. List drawing(s)			

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G. CIVIL	50%*	90%*	REFERENCE DOCUMENTS** Specification / Drawing / Memorandum
with survey information	X	X	
e. Horizontal and vertical survey control monuments must be shown on the drawing(s) List drawing(s) with survey information.	X	X	
4. DEMOLITION:			
a. Verify that demolition requirements are met. Reference specific requirements (which document?) and list drawing(s) that address the requirements.	X	X	
b. Verify that disposal of materials is addressed. List drawings with notes that address the disposal of materials.		X	
c. Verify that disposal of contaminated materials is addressed. List drawings with notes that address the disposal of contaminated materials		X	
d. Demolition plans should show phasing of work (salvage operations, demolition and disposal). List demolition drawings.	X	X	
e. Care of existing utilities and electrical duct banks. List drawing(s) with existing utilities.		X	
f. Show disposal of excavated earth on-site; off-site make notes on plans or specs. List applicable drawing(s).		X	
g. Drawing(s) should indicate clearing and grubbing limits. List civil and architectural drawing(s) that have been checked	X	X	
h. Verify that the site demolition work is coordinated with the architectural site plan. List civil and architectural drawing(s) that have been checked	X	X	
5. UTILITIES:			
a. Utilities and tie ins, use survey information and also field verify by designer. List drawing(s) that have been checked.	X	X	
b. Verify that service meters are located where determined by both the client and local municipalities. List applicable drawing(s)	X	X	
6. SITE DRAINAGE/SEWER DRAWING(S):			
a. Account for drainage of all areas. List applicable drawing(s).	X	X	
b. Verify that drawing(s) clearly indicate the size and	X	X	

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G. CIVIL	50%*	90%*	REFERENCE DOCUMENTS** Specification / Drawing / Memorandum
the length of the storm drain/sewer piping. List applicable drawing(s).			
c. Verify that clean out and drain invert elevations are indicated on the drawing(s) and accurate for positive drainage. List applicable drawing(s).	X	X	
d. Verify that details are provided for underwalk drains. List applicable drawing(s)	X	X	
e. Verify that site drainage is coordinated with building roof / overflow drains. List applicable drawing(s).	X	X	
7. EARTHWORKS & GRATING:			
a. Verify that the borrow and waster area, including truck routes to the construction site is clearly indicated on the drawing(s). List applicable drawing(s)	X	X	
b. Check the coordination between finish floor elevations and finish grades. List applicable drawing(s)	X	X	
c. Verify that original and proposed contours are shown on the drawing(s). List applicable drawing(s)	X	X	
8. CONCRETE & PAVING:			
a. Verify that pavement slopes (2% min). List drawing(s), which have been checked.	X	X	
b. Verify that pavement requirements are per Green Book. List drawing(s), which have been checked	X	X	
c. Exterior concrete with minimum 1% slope. List applicable drawing(s)	X	X	
d. Check the coordination of flatwork, curbs, gutters, and swales between civil drawing(s) and architectural site plan. List applicable drawing(s)	X	X	

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QA/QC CHECK LIST

Project Name: **Project #**
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e. Verify that A/C Pavement is clearly indicated and coordinated with the architectural site plan. List applicable drawing(s)	X	X	
9. PIPING:			
a. All buried valves with rising stems are designed with adequate depth. List drawing(s) that have been checked	X	X	
10. OTHER:			
a. Checks that guard posts (bollards) are placed to protect facilities. List drawings that show and detail bollards	X	X	
b. If caustics and acids drain into sewers, verify with Bureau of Sanitation. List drawings and BOS contact person	X	X	
c. Provide thrust blocks for non-restrained pipes. List applicable drawing(s).	X	X	
d. Verify that the building orientation is consistent with architectural floor plans. List drawing(s) that have been checked.	X	X	
e. Verify that details are shown for all scope of work in the public right-of-way. List drawing(s) that have been checked	X	X	
f. Verify that all site fencing is shown and the details are complete. List drawing(s) that show fencing.		X	
g. Check that details are provided for all site furnishings and that the site furnishings are coordinated with the architectural site plan. List drawing(s) that have been checked.		X	
h. Check coordination of equipment between architectural, electrical and plumbing drawing(s). List drawing(s) that have been checked.		X	

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QA/QC CHECK LIST

Project Name: **Project #**
Phase %:

Reviewer **Date:**

H. STRUCTURAL	50%*	90%*	REFERENCE DOCUMENTS** Specification / Drawing / Memorandum
1. DESIGN CRITERIA:			
a. Indicate soil-bearing pressure used in the design. Indicate whether the value is per code or as specified in a soil report.	X		
b. Indicate dead and live loads used in the design.	X		
c. Indicate seismic and wind design parameters used in the design of main structure and other elements.	X		
d. Appropriate values of C_e,C_q, q_s, and exposure to be indicated on the plans.		X	
e. Specify design compressive strengths used in the design of beams, columns, slabs and footings. Note that continuous inspection is required if more than 2,000 psi.		X	
f. Specify different grades of steel used in structural members.		X	
g. Specify the allowable compressive stress in all masonry units.		X	
h. The value of, f, used in calculating the modular ratio, n, in reinforced masonry design shall not be reduced by one half when continuous inspection is not provided.		X	
i. Masonry walls with an h/t ratio larger than 30 shall be designed and detailed as a slender wall.		X	
j. Specify continuous inspection for reinforced masonry walls designed using ultimate strength procedures.		X	
k. For allowable stresses in building materials, used LABC or Research Report Values only.		X	
l. Grading Division (Bldg. & Safety) conditions of approval of soil report shall be indicated on the plans.		X	
2. EXISTING UTILITIES & DEMOLITION ITEMS:			
a. Indicate all existing underground utilities and structures on the plans. Use “potholing” if necessary to find underground obstructions.		X	
3. FOUNDATION:			
a. If piles used, indicate the design parameters (load capacity, skin friction, etc) as specified in the soil report.	X		.
b. Piles that are designed to resist lateral loads shall be tied in both directions.	X		
c. Show isolated footings for all columns. *Shown on drawings*	X		

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QA/QC CHECK LIST

Project Name: **Project #**
Phase %:

Reviewer **Date:**

H. STRUCTURAL	50%*	90%*	REFERENCE DOCUMENTS** Specification / Drawing / Memorandum
d. Show a continuous foundation for exterior walls.	X		
e. Show foundation under interior loan bearing walls.	X		
f. Indicate sizes and thickness of all footings (Isolated and continuous). Provide schedule when necessary.	X		
g. Show foundation (thickened slab) under masonry partitions.	X		
h. Show special foundation requirements for vibrating machinery & equipment.	X		
i. Show foundation of all pipe and equipment supports.	X		
j. Show details of equipment pads. Indicate that anchor bolts for equipment have embedment length indicated into concrete base and not only the Housekeeping Pad.		X	
k. Check clearances between structure on the plans.	X		
l. If adjacent existing structures are being shored, provide monitoring surveys, “before and after photographs”, and clear instructions to the shoring contractor indicating options for shoring, allowable deflection of soldier piles or bracing. Check specifications to ensure that obstructions and their removal are clearly addressed. Refer Spec. Section		X	
m. Show all retaining walls and provide details.	X		
n. Drainage of basement walls shall be shown on plans unless wall was designed for hydrostatic pressure.	X		
4. CONCRETE SLABS:			
a. Show thickness and reinforcement of slab on grade and floor slabs.		X	
b. Indicate direction of main reinforcement of structural slabs (one-way).	X		
c. Show locations and details of depressed slabs, if any.	X		
d. Show location of all penetrations through floor, roof and walls.	X		
e. Show additional reinforcement at structural slab opening.	X		

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QA/QC CHECK LIST

Project Name: **Project #**
Phase %:

Reviewer **Date:**

H. STRUCTURAL	50%*	90%*	REFERENCE DOCUMENTS** Specification / Drawing / Memorandum
f. Verify dimensions, grids and column center lines.	X		
5. COLUMNS & SHEAR WALLS:			
a. Column base plates and anchor bolts designed for the proper loads (i.e. vertical loads only for pinned condition and vertical loads and moment for fixed condition) shall be properly detailed.		X	
b. Indicate camber of beams and girders when needed.		X	
c. Provide detail of diaphragm connection to beams (shear transfer).	X		
d. Show lateral load resisting system of structure on framing plans and/or elevations.	X		
e. Provide complete details of connections resisting lateral loads.	X		
f. Show framing on slab or deck openings. Show framing at wall openings.	X		
g. Verify that lateral load is transferred by the shearwall to the foundation.	X		
h. Indicate all column sizes and wall thicknesses.	X		
i. Indicate all top of steel elevations. *Shown on drawings*	X		
j. Indicate location of sump pits and elevator pits. Check elevator pit slab for buffer reactions provided by elevator mfr.	X		
k. Verify dimensions, grids and column center lines.	X		
l. Provide stair framing and connection details.		X	
m. Show all beam, joist and girder sizes. Provide schedule as necessary.		X	
n. Provide details of elevator shafts. Show hoist beams, rails and sill angles.		X	

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Reviewer **Date:**

H. STRUCTURAL	50%*	90%*	REFERENCE DOCUMENTS** Specification / Drawing / Memorandum
o. Show location and framing details of all cranes and hoists.		X	
p. Show location and details of all mechanical platforms.	X		
q. Show location and details of seismic joints.	X		
r. Show connection details of curtain walls or cladding.	X		
s. Indicate metal deck type, gage, manufacturer and LA Research Report number.	X		
t. Verify weld ability of welded materials.	X		
u. Show locations of all cages and ladders.	X		
v. Elements of structures and nonstructural components such as pipe supports, storage racks, signs, suspended ceilings, etc, to be detailed on the plans.		X	
w. For masonry walls, show the horizontal and vertical reinforcement. Verify that the bar diameter and spacing conform to code prescribed minimum requirements.		X	

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QA/QC CHECK LIST

Project Name: **Project #**
Phase %:

Reviewer **Date:**

I. ELECTRICAL	50%*	90%*	REFERENCE DOCUMENTS** Specification / Drawing / Memorandum
1. Indicate inrush and starting power requirements of electrical equipment on Single Lines of Motor Control Centers, Switchgears, etc		X	
2. Verify that the Single Line Diagram indicates the following : a. Available fault current amps b. Voltage Drop c. Conduit length/fill d. Wire gauge/Cable O.D.		X	
3. Verify Calculations for Batteries, Chargers and DC Panels.	X		
4. Verify for the grounding system the following: a. Type of grounding system(solid, resistors, reactors, transformer) b. Grounding connection and details for equipment, tanks, vessels, etc. c. Grounding grid system d. Bonding jumpers for powder lines, conveying systems and gasketed metallic pipe lines.	X		
5. Verify for the Switchgear the following: a. Main and branch circuit protection overload and short circuits ratings b. Circuit breakers rated to available short circuit current. Spares. c. Access and removal space. d. Elevation and clearance.	X		.
6. Verify for the Motor Control Centers the following: a. Feeder breakers and combination starters to be fully rated for the available short circuit current. b. Maximum disconnecting height as required by NEC including mounting concrete pad. (6' - 6" max, from operating floor) c. Nema class type of MCC	X		.

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Reviewer **Date:**

I. ELECTRICAL	50%*	90%*	REFERENCE DOCUMENTS** Specification / Drawing / Memorandum
d. Spares, spaces, sections. e. Access, elevation, clearance, future expansion.			
7. Verify for Electric Motors the following: a. Enclosure type: TEFC,drip-proof b. Service factor and torque, c. Temperature protection, d. High efficiency, e. Low noise, f. Insulation, Shop test requirements.		X	.
8. Indicate on Single line diagram circuit protection designed to withstand the available short circuit current. (Fully rated)	X		
9. Verify metering requirements. Indicate provision for connection of demand reading and monitoring devices.	X		
10. Verify requirements for emergency power: a. Battery and battery chargers b. Generator	X		
11. Verify for Uninterruptible Power Supply (UPS) the following: a. Calculation of Battery amp.-hr. b. Show dual power feed c. Provide maintenance by-pass switch	X		
12. Verify for Variable Frequency Drives (VFD) the following: a. Separate maintenance switch. b. Harmonic calculation c. Indicate tests required. d. Compliance with the latest IEEE519 e. If possible, locate near motor. f. Motor shall be compatible with VFD		X	

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QA/QC CHECK LIST

Project Name: **Project #**
Phase %:

Reviewer **Date:**

I. ELECTRICAL	50%*	90%*	REFERENCE DOCUMENTS** Specification / Drawing / Memorandum
13. Verify loadshedding requirements a. Specify electrically operated breaker b. Provision for shunt trip. c. Provide current Transducers		X	.
14. Verify for area classification: a. Class description b. Separate drawing for boundaries. c. Coordinate with specifications		X	.
15. Verify coordination of ductbank/maintenance holes with sewer and other substructures and the following: a. Verify as-built condition b. Potholing if required c. Minimum cover requirements	X		.
16. Indicate lightning/surge protection	X		
17. Specify requirements for short circuit study.		X	
18. Verify lighting requirements (foot candle levels for all areas). Provide high efficiency fixtures as follows: a. High pressure sodium b. fluorescent	X		
19. Verify that emergency lighting/exit signs fixtures are self contained or connected to a two separate source of power.		X	.
20. Verify separation between power and instrument signal wiring –Provide separate raceways for: 480v, 120v, analog signal (4 to 20 ma), and digital signal (DCS)	X		
	X		

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QA/QC CHECK LIST

Project Name: **Project #**
Phase %:

Reviewer **Date:**

I. ELECTRICAL	50%*	90%*	REFERENCE DOCUMENTS** Specification / Drawing / Memorandum
21. Verify purging requirements for electrical panels and enclosures			
22. Telephone system Indicate single line diagram, type of outlets, specify conductors a. Emergency b. Public c. Plant		X	
23. Public address system to be compatible with existing system. Coordinate with Master Plan.	X		
24. Security system (closed circuit television, intrusion detection) See Master Specifications	X		
25. PVC coated (interior and exterior) rigid steel conduits/fittings, supports, etc. at process areas/outdoors	X		
26. Construction power requirements. Coordinate with plant for connection of meter and payment. Details in specifications.		X	.
27. Building and Safety plan check required. Obtain variances and approvals.		X	.
28. Utility coordination for type of service, short circuit current, space requirements, protection		X	.
29. Indicate shop inspections in the specifications.		X	.
30. Specify UL listed equipment and devices in drawings and specifications.		X	.

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QA/QC CHECK LIST

Project Name: **Project #**
Phase %:

Reviewer **Date:**

I. ELECTRICAL	50%*	90%*	REFERENCE DOCUMENTS** Specification / Drawing / Memorandum
31. Verify instruments voltages		X	
32. Verify safe maintenance clearances on all equipment. Coordinate with Mechanical, Structural, Civil and Architectural.		X	
33. Verify door opening for large equipment with Architectural and Structural Drawings.		X	
34. Specify two manufacturers and equal for major equipment. Verify availability.		X	
35. Technical memo issued for sole sourced equipment - Board Report required.		X	
36. Specify relay coordination study requirements		X	.
37. Specify related painting requirements.		X	.
38. Specify Manufacturer Training		X	
39. Verify 6' - 6" requirement of height limitation for controllers (consider concrete pad).		X	
40. High voltage terminators shall be porcelain by Joslyn type PSC or per Plant requirements.		X	.
41. Require schematic diagrams for instrumentation and equipment control		X	
		X	

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Reviewer **Date:**

I. ELECTRICAL	50%*	90%*	REFERENCE DOCUMENTS** Specification / Drawing / Memorandum
42. Coordinate PI&D, I, and Electrical drawings for power and control requirements.			
43. Verify in the mechanical specifications for equipment power requirements		X	.
44. Verify that general notes are project specific.		X	
45. Verify that symbols shown on the plans appear on the Symbol list.		X	
46. Verify that switch and receptacle heights are located per Title 24.		X	
47. Verify that demolition is addressed in General Notes and/or Specifications.		X	
48. Verify that demolition notes clearly indicate whether material is salvage/stored or disposed of.		X	
49. Verify that fire Alarm post indicator valve shown on the plumbing plans is connected to the Fire Alarm System.		X	
50. Verify that all the utilities are intercepted and routed to the appropriate buildings or service yard.		X	
51. Verify that site lighting in excess of 75 foot length is de-rated and voltage drop is addressed.		X	
		X	

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I. ELECTRICAL	50%*	90%*	REFERENCE DOCUMENTS** Specification / Drawing / Memorandum
52. Verify that irrigation controllers shown on landscape plans have power provided.			
53. Verify that wiring conduit and cable trays crossing separation/expansion joints have flexible connections. Connections are detailed and are consistent with the specifications.		X	
54. When routing major duct banks in the streets, verify that all utilities are shown on the plane.		X	
55. Coordinate thermostat locations between architectural, Mechanical and Electrical.		X	
56. Check with Structural/Architectural the integrity of wall rating when installing electrical panels.		X	
57. Check the location and type of lighting fixtures between Architectural relected and Electrical Roof. Ceiling plans.	X	X	
58. Coordinate location of Roof matches with architectural	X	X	
59. Compare architectural elevations with electrical exterior building lights/alarm, etc.	X	X	
60. Compare the structural foundation plan with electrical floor plans and check location of underground conduits and grounding conductors.	X	X	
61. Verify that the voltages listed are available and provided in the electrical scope of work	X	X	

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I. ELECTRICAL	50%*	90%*	REFERENCE DOCUMENTS** Specification / Drawing / Memorandum
including.			
62. Verify that Roof 120 vac receptacles are within 25 feet of all roof equipment	X		
63. Verify that detectors must shut down HVAC units and annunciates the fire alarm system		X	
64. Verify that lights within 15 feet of windows are switched separately.		X	
65. Verify that 3-way switching are provided in areas/rooms with more than one entrance.	X	X	
66. Verify if light sensors are required		X	
67. Verify that mechanical and plumbing equipment requiring power have power connections and means of disconnect.		X	
68. Verify that 2 exits are provided where switchboard exceeds 1200 Amps.	X	X	
69. Verify that all lighting panels are shown on the one-line diagram.	X	X	
70. Verify that all three phase exhaust and supply fans have magnetic starter at unit or at the MCC.		X	
71. Verify that all single phase exhaust or supply fan have horsepower rated manual starter at unit or disconnect switch.		X	
72. Verify that fire alarm visual strobes are		X	

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I. ELECTRICAL	50%*	90%*	REFERENCE DOCUMENTS** Specification / Drawing / Memorandum
located in all public areas or congested process facilities.			
73. Panel Schedules a. Indicate total watts and amps. b. Panelboard bus ampacity shall be larger that the calculated loads plus demand factors and long continuous load factor. c. Main circuit breaker shall not be larger than the panel board bus rating. d. AC loads shall have long continuous load factor.	X	X	
74. Verify that all lighting fixtures on plans are indicated on the lighting schedule.	X	X	
75. Verify on the details that the method of attachment of electrical items to the structure are completely specified.	X	X	
76. Verify that all of the materials are referenced and are consistent with the specifications.	X	X	
77. Verify that the details are consistent with conditions and detail in other disciplines.		X	
78. Verify height of emergency stop push button at 42 inches aff. See details.		X	
79. Provide for a remote Fire Alarm Annunciator Panel if required		X	
80. Verify that roof mounted A/C units have a fusible disconnect switch as per manufacturers recommendations		X	
81. Verify grounding bonding requirements of		X	

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Phase %:

Reviewer **Date:**

I. ELECTRICAL	50%*	90%*	REFERENCE DOCUMENTS** Specification / Drawing / Memorandum
conduits entering enclosures, panels, equipments, etc.			
82. Indicate on drawings notes to land on terminal blocks all wiring requiring external connections		X	
83. Verify that equipment is provided with factory installed terminal blocks to terminate external connections.		X	
84. Verify power requirements for flow switched and control valves		X	
85. Indicate in specifications that a trained qualified High Voltage Cable Splicer perform all High Voltage Splices and Terminations.		X	
86. Indicate in specifications to require cable tray drop outs for all cables leaving the cable tray and entering into conduit nipples at top of the Switchgear.		X	
87. Verify that sprinkler or piping systems do not run in the electrical room or above the MCC's or switchgear		X	
88. Verify that access panels are provided for junction boxes installed above elevator lobby ceilings.		X	
89. Verify that A/C circuit breakers are adjustable type and in compliance with NEC 440-2, 440- 22.		X	
90. Verify that there is a building service disconnect installed nearest the feeders point		X	

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Project Name: **Project #**
Phase %:

Reviewer **Date:**

I. ELECTRICAL	50%*	90%*	REFERENCE DOCUMENTS** Specification / Drawing / Memorandum
of entrance to the building.			
91 Indicate all intrinsically safe circuits in separate raceways, with barriers inside control panels and labels as per NEC 504		X	
92. Provide required transformer secondary protection at the source of power as per NEC 240-3, 240-21.		X	
93. Perform Title 24 energy calculations and provide lighting controls.		X	

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QA/QC CHECK LIST

Project Name: **Project #**
Phase %:

Reviewer **Date:**

J. INSTRUMENTATION	50%*	90%*	REFERENCE DOCUMENTS** Specification / Drawing / Memorandum
1. Process description and design criteria	X	X	
2. General level (Check Box) ☐ a) DCS ☐ b) PLC ☐ c) electronic ☐ d) local pneumatic ☐ e) other	X	X	
3. Control system power backup (UPS)	X		
4. Control system expansion required I/O points and data points		X	
5. DCS or PLC logic	X		
6. DCS or deenergize to trip - fail safe		X	
7. Hazardous area classification	X		
8. Purging of instrument enclosures with inert gas		X	
9. Nema 4x (corrosion resistant stainless steel) instr-electrical enclosures		X	
10. Control valve sizing criteria	X		
11. Allowable control valve noise		X	
12. Control valve fail open, fail closed, fail in place		X	
13. Valve tight shut-off requirements		X	

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QA/QC CHECK LIST

Project Name: **Project #**
Phase %:

Reviewer **Date:**

J. INSTRUMENTATION	50%*	90%*	REFERENCE DOCUMENTS** Specification / Drawing / Memorandum
14. Double block and bleed where necessary		X	
15. Relief valve set pressure; certification sizing criteria		X	
16. Flow element turndown ratio		X	
17. Flow element minimum approach		X	
18. Analytical instrument sample system requirements, including heat tracing –		X	
19. Analytical equipment certification Requirement (UL, FM, SAMA, etc.)		X	
20. Process sampling details		X	
21. Process analyzers		X	
22. Shut down logic		X	
23. Instruments accessible for operation and maintenance		X	
24. Voltage requirements for instruments specified		X	
25. Instrument Data Sheets		X	
26. Loops descriptions		X	
27. Considered utilization of instruments and devices using 24 volts DC		X	

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QA/QC CHECK LIST

Project Name: **Project #**
Phase %:

Reviewer **Date:**

J. INSTRUMENTATION	50%*	90%*	REFERENCE DOCUMENTS** Specification / Drawing / Memorandum
28. Specified UL listed equipment components and devices		X	
29. Cabinet/panels accessible for safe maintenance		X	
30. Shop inspection requirements		X	
31. Considered air conditioning unit for large cabinets/panels		X	
32. Specified two manufacturers and/or equal for costly equipment		X	
33. Technical memo issued for sole sourced equipment-Board Report required		X	
34. Indicators to be located within viewing height		X	
35. Specified painting requirements		X	
36. Specified Manufacturers Training Program		X	
37. Verify that general notes are project specific	X	X	
38. Verify that symbols shown on the P & ID's appears on the symbol list	X	X	
39. Verify that abbreviations shown on the P	X	X	

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QA/QC CHECK LIST

Project Name: **Project #**
Phase %:

Reviewer **Date:**

J. INSTRUMENTATION	50%*	90%*	REFERENCE DOCUMENTS** Specification / Drawing / Memorandum
& ID's appears on the PD and E drawings			
40. Verify that equipment shown on the P & ID's appears on the PD and E drawings	X		
41. Verify that site demolition work is coordinated with PD and E drawings	X		
42. Verify that there is adequate access space for equipment maintenance	X		
43. Verify accounting of instrument tag numbers between specifications, PD drawings		X	
44. Verify adequate power supply for instruments and LCP's.		X	

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QA/QC CHECK LIST

Project Name: **Project #**
Phase %:

Reviewer **Date:**

K. OPERABILITY	50%*	90%*	REFERENCE DOCUMENTS** Specification / Drawing / Memorandum
1. Operating procedures		X	
2. Maintenance procedures		X	
3. Emergency procedures		X	
4. Vendor erection and startup		X	
5. Rotation and alignment		X	
6. Loop checks		X	
7. Instrument & relay calibration		X	
8. Leak and pressure tests		X	
9. Cleanliness class for piping		X	
10. Tie-ins at battery limits		X	
11. Purging		X	
12. Lubrication		X	
13. Spare parts		X	
14. Special tools		X	
15. Operating chemicals and supplies		X	
16. Inspection sign off		X	
17. Temporary strainers & blinds		X	
18. Temporary flush and steam blow piping		X	
19. Housekeeping & storage area		X	
20. Laydown areas for maintenance		X	
21. Operating permits		X	

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QA/QC CHECK LIST

Project Name: **Project #**
Phase %:

Reviewer **Date:**

L. SAFETY	50%	90%	REFERENCE DOCUMENTS Specification / Drawing / Memorandum
1. Fire Protection:			
a. Description of type of fire protection equipment and/or systems & evacuation plan.		X	
b. Fire doors and shutters unobstructed and protected against obstructions, including their own counterweights		X	
c. Sprinkler heads protected by metal guards when exposed to physical damage		X	
d. Permanent sprinkler systems installed so that the nozzle heads are directed or arranged so that water will not be sprayed into operating electrical switchboards and equipment		X	
e. Proper clearance maintained below sprinkler heads		X	
f. Portable fire extinguishers provided in adequate number and type		X	
g. Fire extinguishers mounted so that personnel do not have to travel more than 75 feet for a Class A fire or 50 feet for a Class B fire		X	
h. "No Smoking" signs posted where appropriate		X	
2. General Work Environment:			
a. Slip resistant surfaces		X	
b. Appropriate chemical storage		X	
c. Minimum number of toilets and washing facilities provided		X	
d. Adequate work area illumination		X	
e. Electrical equipment protection - contractor shall install drip pans such that equipment is protected from water spray		X	
f. Work area ventilation system appropriate for work being performed		X	
g. Engineering controls to reduce excessive noise levels		X	

* % column indicates phase of project at which item is to be completed.
** in reference documents column, must indicate specific documents, such as drawing number, specifications section or design memorandum. If item does not apply, indicate as such by using "N/A."

QA/QC CHECK LIST

Project Name: **Project #**
Phase %:

Reviewer **Date:**

L. SAFETY	50%	90%	REFERENCE DOCUMENTS Specification / Drawing / Memorandum
h. Exhaust stacks and air intakes located so that contaminated air will not be recirculated within a building or other enclosed area		X	
i. Safety showers/eyewash		X	
j. Protective clothing		X	
3. Walkways:			
a. Aisles and walkways marked as appropriate		X	
b. Wet surfaces covered with nonvslip surfaces		X	
c. Safe clearances for walking in aisles where motorized mechanical handling equipment is operating		X	
d. Sharp edges of equipment not interfering with walkways		X	
e. Changes of direction or elevations readily identifiable		X	
f. Aisles or walkways that pass near moving or operating machinery, welding operations, or similar operations arranged so employees will not be subject to potential hazard		X	
g. Provide a minimum clearance of 6'-8'= for entire length of any aisle or walkways		X	
h. Standard guardrails provided wherever aisle or walkway surfaces are elevated more than 30 inches above any adjacent floor or the ground		X	
4. Floor and Wall Openings:			
a. Floor openings guarded by a cover, guardrail, or equivalent on all sides, except at entrances to stairways or ladders	X		
b. Toeboards installed around the edges of a permanent floor opening where there are persons who may pass below the opening	X		
c. Skylight screens of such construction and mounting that they will withstand a load of at least 200 pounds.	X		

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QA/QC CHECK LIST

Project Name: **Project #**
Phase %:

Reviewer **Date:**

L. SAFETY	50%	90%	REFERENCE DOCUMENTS Specification / Drawing / Memorandum
d. Specify tempered or wire glass which is subject to human impact.	X		
e. Grates or similar covers over floor openings, such as floor drains, of such design that foot traffic or rolling equipment will not be affected by the grate spacing	X		
f. Unused portions of service pits and pits not actually in use either covered or protected by guardrails or equivalent	X		
g. Maintenance hole covers, trench covers, and similar covers, plus their supports, designed to carry a truck rear axle load of at least 20,000 pounds when located in roadways and subject to vehicle traffic	X		
h. Floor or wall openings in fire resistive construction provided with doors or covers compatible with the fire rating of the structure, and provided with selfvclosing features when appropriate	X		
5. Stairs and Stairways:			
a. Standard stair rails or handrails on all stairways having four or more risers		X	
b. All stairways at least 22 inches wide		X	
c. Stairs have 6'v8" minimum overhead clearance		X	
d. Stairs angle no more than 50° and no less than 30°		X	
e. Stairs of hollowvpan type treads and landings filled to nosing level with solid material		X	
f. Step risers on stairs to be uniform from top to bottom, with a minimum run of 11" & max. rise of 7".		X	
g. Stairway handrails located between 30 and 34 inches above the leading edge of the stair treads		X	
h. Stairway handrails have at least 12 inches clearance between the handrails and the wall or surface to which they are mounted		X	

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QA/QC CHECK LIST

Project Name: **Project #**
Phase %:

Reviewer **Date:**

L. SAFETY	50%	90%	REFERENCE DOCUMENTS Specification / Drawing / Memorandum
i. Stairway handrails capable of withstanding a load of 200 pounds applied in any direction		X	
j. Adequate barriers and warnings provided where stairs or stairways exit directly into any area where vehicles may be operated		X	
k. Stairway landings to have a dimension in the direction of travel at least equal to the width of the stairway		X	
l. Vertical distance between stairway landings limited to 12 feet or less		X	
6. Fixed Ladders:			
a. Minimum design live load shall be a single concentrated load of 200 pounds to conform with LABC & OSHA		X	
b. Rungs shall have a minimum 1 inch diameter for metal		X	
c. Distance between top surfaces of rungs, cleats, and steps shall not exceed 12 inches and shall be uniform throughout the length of the ladder		X	
d. Minimum length of rungs or cleats shall be 16 inches		X	
e. Rungs of an individual rung ladder shall be designed so that the climber's foot cannot slide off the end of a rung		X	
f. Side rails which might be used as a climbing aid shall be of such cross section as to provide adequate gripping surface without sharp edges, splinters, or burrs		X	
g. Fasteners shall be an integral part of fixed ladder design		X	
h. Clearance between nearest permanent object shall be provided		X	
7. Elevated Surfaces:			
a. Signs posted, when appropriate, showing the elevated surface load capacity		X	
b. Surfaces elevated more than 30 inches above the floor or ground require standard guardrails		X	

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QA/QC CHECK LIST

Project Name: **Project #**
Phase %:

Reviewer **Date:**

L. SAFETY	50%	90%	REFERENCE DOCUMENTS Specification / Drawing / Memorandum
c. Elevated surfaces, beneath which people or machinery could be exposed to falling objects, provided with standard 4vinch toeboards		X	
d. Permanent means of access and egress provided to elevated storage and work surfaces		X	
e. The minimum headroom shall be 6'-8"		X	
8. Exit or Egress:			
a. All exits to be marked with an exit sign and illuminated by a light source		X	
b. Directions of exits, when not immediately apparent, marked with visible signs		X	
c. Doors, passageways or stairways, that are neither exits nor access to exits and which could be mistaken for exits, appropriately marked NOT AN EXIT, TO BASEMENT, STOREROOM, and the like		X	
d. Exit signs provided with the word EXIT in lettering at least 5 inches high with a stroke at least 2 inch wide		X	
e. Exit doors side hinged		X	
f. At least two means of egress provided from elevated platforms, pits, or rooms where the absence of a second exit would increase the risk of injury from hot, poisonous, corrosive, suffocating, flammable, or explosive substances		X	
g. Provide sufficient exits to permit prompt escape in case of emergency		X	
h. Number of exits from each floor of a building, and the number of exits from the building itself, appropriate for the building occupancy load		X	

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QA/QC CHECK LIST

Project Name: **Project #**
Phase %:

Reviewer **Date:**

L. SAFETY	50%	90%	REFERENCE DOCUMENTS Specification / Drawing / Memorandum
i. Exit stairways which are required to be separated from other parts of a building, enclosed by at least two–hour fire resistive construction in buildings more than four stories in height, and not less than one–hour fire resistive construction elsewhere		X	
j. When ramps are used as part of required exiting from a building, ramp slope limited to 1 foot vertical rise per 12 feet horizontal run		X	
k. Where exiting will be through frameless glass doors, glass exit doors, storm doors, and such, doors must be fully tempered and meet safety requirements for human impact		X	
9. Exit Doors:			
a. Doors which are required to serve as exits designed so that the way of exit travel is obvious and direct		X	
b. Windows which could be mistaken for exit doors made inaccessible by means of barriers or railings		X	
c. Exit doors open from the direction of exit travel without the use of a key or any special knowledge or effort		X	
d. Revolving, sliding, or overhead doors prohibited from serving as a required exit door		X	
e. Where panic hardware is installed on a required exit door, allow the door to open by applying a force of 15 pounds or less in the direction of the exit traffic.		X	
f. Doors that swing in both directions and are located between rooms provided with viewing panels in each door.		X	
10. Machinery and Equipment			
a. Training program to instruct employees on safe methods of operating new machinery		X	

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QA/QC CHECK LIST

Project Name: **Project #**
Phase %:

Reviewer **Date:**

L. SAFETY	50%	90%	REFERENCE DOCUMENTS Specification / Drawing / Memorandum
b. Sufficient clearance provided around and between machines to allow for safe operations, set up, servicing, material handling, and waste removal		X	
c. Equipment and machinery securely placed and anchored when necessary to prevent tipping or other movement that could result in personal injury		X	
d. Power shutoff switch within reach of operator's position at each machine		X	
e. Noncurrent carrying metal parts of electrically operated machines bonded and grounded		X	
f. Foot operated switches guarded or arranged to prevent accidental actuation by personnel or falling objects		X	
g. Manually operated valves and switches controlling the operation of equipment and machines clearly identified and readily accessible		X	
h. All emergency stop buttons colored red		X	
i. Pulleys and belts that are within 7 feet of floor or working level properly guarded		X	
j. All moving chains and gears properly guarded		X	
k. Splash guards mounted on machines that use coolant to prevent coolant from reaching personnel		X	
l. Revolving drums, barrels, and containers guarded by an enclosure that is interlocked with the drive mechanism so that revolution cannot occur unless the guard enclosure is in place		X	
m. Machines constructed so as to be free from excessive vibration when the largest size tool is mounted and run at full speed		X	
n. Fan blades protected with a guard having openings no larger than 2 inches when operating within 7 feet of the floor.		X	
o. Equipment control valve handles provided with a means for locking out		X	
11. Material Storage:			

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QA/QC CHECK LIST

Project Name: **Project #**
Phase %:

Reviewer **Date:**

L. SAFETY	50%	90%	REFERENCE DOCUMENTS Specification / Drawing / Memorandum
a. Storage rooms for flammable and combustible liquids must have mechanical or gravity ventilation		X	
b. For liquefied petroleum storage tanks, provide guardrails to prevent damage from vehicles.		X	
c. Appropriate fire extinguishers mounted within 75 feet of outside areas containing flammable liquids and within 10 feet of any inside storage area for such materials		X	

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QA/QC CHECK LIST

Project Name: **Project #**
Phase %:

Reviewer **Date:**

M. SPECIAL REPORTS	50%*	90%*	REFERENCE DOCUMENTS** Specification / Drawing / Memorandum
1. Soils Report	X		
2. Environmental Impact Report (EIR)	X		
3. Hazardous Waste/Materials Report	X		
4. Air Emission Control Report - AQMD	X		
5. Noise Emission Report (NER)	X		
6. Potholing Report	X		
7. Odor Mitigation Report	X		

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** in reference documents column, must indicate specific documents, such as drawing number, specifications section or design memorandum. If item does not apply, indicate as such by using "N/A."

QA/QC CHECK LIST

Project Name: **Project #**
Phase %:

Reviewer **Date:**

N. CADD GENERATED DRAWINGS	50%*	90%*	REFERENCE DOCUMENTS** Specification / Drawing / Memorandum
1. Standard cover sheet	X		
2. Standard R sheets	X		
3. Standard drawing index sheet; correct font, weight, size and spacing	X		
4. Standard north arrow; standard key location map (plan)	X		
5. Standard font, weight, and size of the following: a. Project number b. Drawing number c. Work order number d. Project title e. Drawing title	X		
6. CADD file name reflects Project Number and Sheet Number, e.g., 3044-PD41	X		
7. Standard border: utilized as reference file	X		
8. Other checks	X		

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QA/QC CHECK LIST FOR GENERAL REQUIREMENT

Project Name: **Project #**
Phase %:

Reviewer **Date:**

Date: May 10, 2018

O. CONTRACT SECTION	DESCRIPTION	RESPONSIBILITY	4
GEN. CON.	**MAKE SURE THAT THE LATEST EDITION OF THE GENERAL CONDITIONS IS USED FOR THE PROJECT. NO CHANGES ALLOWED WITHOUT PRIOR APPROVAL OF THE CITY ATTORNEY.**	PE	
GR 1212	**DESCRIPTION OF WORK** a. Narrative b. Sequence of Construction c. Milestone Description and Schedule Dates d. Special Precautions and Restrictions	PE PE/CM	
GR 1140	**SITE SECURITY** - Check applicable paragraphs corresponding to the jobsite location, i.e. HTP, TITP, TWRP, LAG.	PE/CM	
GR 1561 & 1562	**ENVIRONMENTAL** - Pending revision. Consult with Committee & City Attorney if necessary. May need to include MMIP as attachment. Consult with Russ Ruffing if special provisions need to be included. Any remodel job must be surveyed for asbestos and lead. If there is any asbestos or lead, notify the Contractor here and decide who is going to remove it. Give results of negative test as an attachment.	PE	
GR 1721	**MOBILIZATION** Trailer & Site Office Equipment Allowance in Schedule of Work and Prices GR 1520-Temporary Construction Utilities - Special Accommodations?	PE/CM CM	
GR 1782	**TECHNICAL MANUALS** Specify # of Copies. If there are early milestones with partial completions, the Contractor has to be warned about early manuals required Determine Liquidated Damages if applicable. Review training requirement.	PE/CM	
GR 1330	**SUBMITTAL** (# of Copies - Generally 10, may be able to reduce)	CM	
GR 1712	**SUBSURFACE DATA** Needs an accuracy disclaimer if a geotechnical report is included.	PE	
GR 1722	**SURVEYING** (City Survey is specified.) Alternative language for contractor to perform survey is available in master spec if necessary. Needs management approval. Include an allowance for contractor to perform survey in the event the City is unable to provide this service.	CM	
GR 1453	**SAMPLING, TESTING AND FABRICATION INSPECTION** Include in the Schedule of Work and Prices an allowance for City Inspection.	CM	
GR 1321	**CONSTRUCTION SCHEDULE** Select type of schedule (Mini, Short, Moderate, Long) based on project size. Make sure schedule L.D.'s match Notice to bidders and L.D./GR	PE CM	

QA/QC CHECK LIST FOR GENERAL REQUIREMENT

Project Name: **Project #**
Phase %:

Reviewer **Date:**

O. CONTRACT SECTION	DESCRIPTION	RESPONSIBILITY	4
	section.		
GR 1292	**PARTIAL PAYMENTS** Review and determine whether special provisions need to be included in this Article.	PE	
GR 1296	**PAYMENT FOR MATERIALS OR EQUIPMENT DELIVERED AND STORED ON THE JOBSITE** In special instances, this may need to be reviewed by the City Risk Manager for evaluation of insurance requirements.	PE	
GR 1297	**PAYMENT FOR MATERIALS OR EQUIPMENT STORED OFF THE JOBSITE** In special instances, this may need to be reviewed by the City Risk Manager for evaluation of insurance requirements.	PE	
GR 1211	**ALLOWANCE FOR EQUIPMENT SUBSTITUTION FOR COMPATIBILITY PURPOSES** Delete this Article if not applicable to the project. If applicable, include an allowance in the Schedule of Work and Prices.	PE/CM	
GR 1120	**INTERFACE COORDINATION REQUIREMENTS** - Select appropriate paragraphs for project location. Add additional requirements as needed. Be specific & assume worst case. Include as attachment the SPA and SOPER forms if applicable.	PE/CM	
GR 1781	**EQUIPMENT SPARE PARTS -** Estimate the cost of recommended spare parts in addition to those provided under the technical section of the specs. and include the amount as an allowance in the Schedule of Work and Prices.	PE/CM	
GR 1322	**PROGRESS PHOTOS** - Determine # of Views	CM	
GR 1750	**STARTUP ASSISTANCE** - Determine Length of Startup Assistance Period and make sure that the Allowance is in the Schedule of Work and Prices.	CM	
GR 1562	**ENVIRONMENTAL MITIGATION** - Delete Hyperion Language and reference to MMIP for projects outside HTP.	CM	
GR 1252	**CONSTRUCTION INCENTIVE PROPOSAL** - Consider project value engineering opportunities for the project and review with management whether to delete or not.	CM	
GR 1311	**PRECONSTRUCTION SAFETY CONFERENCE -** Check with Sanitation on applicable lock-out/tag-out, confined space entry, hazardous materials/waste control procedures that need to be included as Appendix in the Specs.	PE/CM	
GR 1732	**POTHOLING -** Contractor is required to perform potholing to verify exact location of utilities shown on contract documents. For projects with substantial underground work, consider including an allowance for	PE/CM	

QA/QC CHECK LIST FOR GENERAL REQUIREMENT

Project Name: **Project #**
Phase %:

Reviewer **Date:**

O. CONTRACT SECTION	DESCRIPTION	RESPONSIBILITY	4
	additional potholing that may be necessary for undocumented utility lines. Review with management.		
GR 1351	**ESCROW BID DOCUMENTS** - Requires management approval.	CM/PE	
GR 1352	**DISPUTES RESOLUTION BOARD** - Requires management approval.	CM/PE	
GR 1820	**TRAINING** - PE should review training requirements with HRDD during design. Specific equipment requiring VENDOR training must be listed in technical specs. On small non-complex projects, consider doing process training in house with contractor/vendor supplied training materials. If so, then a Bid allowance is required. GR language may have to be tailored to meet needs of a specific project.	PE/CM	
GR 1451	**APPROVAL OF ELECTRICAL EQUIPMENT** - This is new language that is not in the master spec. Use on all projects. Do not remove.	NA	
GR 1563	**ALLOWANCE FOR SEWER BYPASS SYSTEM**: This allowance shall be included for all wastewater projects with potential sewage spill. The allowance will cover all cost associated with Section B-1 through 9 of the **POLLUTION CONTROL - SEWAGE SPILL PREVENTION RESPONSE REQUIREMENTS** Section 1563 of the General Requirements.	PE/CM	
GR 1253	**DIFFERING SITE CONDITIONS** - If allowance for Differing Site Conditions is used, include this article - Otherwise delete	PE	
GR 1212	**FIXED CASH ALLOWANCE ITEMS -** List items included as allowance in the Schedule of Work and Prices. Be certain that allowed overhead and profit are consistent throughout the specs.	PE/CM	
GR __	**ALLOWANCE FOR KNOWN BUT UNSCOPED WORK** - Should allowance for this work be necessary include this Article with wordings tailored to fit project needs. NO SPECIFICATIONS AT THIS TIME	PE/CM	

Rev. 06/01/06

PE = Project Design Engineer CM = Project Estimator/Construction Management Team
CON = Contract Administration

Note: 1. On complex Instrumentation & Control Projects, include I/C subcontractor qualification statement in GR and in Technical references.
2 Any new allowance item will require separate Article in the General Requirements and must receive Management's approval.
3. Board Report for sole-sourced equipment.

QA/QC CHECK LIST FOR BID PROPOSAL

Project Name: **Project #**
Phase %:

Reviewer **Date:**

Items to be Completed (Prepared jointly by PE and Project Award & Control Division)

P. BID PROPOSAL			
ITEM	**DESCRIPTION**	**RESPONSIBILITY**	4
1	**IMPORTANT NOTICE** A. Bidder's Submittals B. Pre-Bid Meeting - Date by Project Award & Control Division (PACD), Location by PE, MBE/WBE/OBE -By PACD C. MSM Requirement -By Construction Division D. Contractor Participation -By PACD E. Bidder Information and Assistance-*Contact Name* - By PE, *Deadline for Question*s - By PACD F. Contractor's License Classification -By PACD	**PE/PACD**	
2	**PROPOSAL - PART I** **Cover Page** - Project Name, Number & Number of Volumes Insert "*Cash"* Contract Insert *D Numbers* - By PE Insert Completion Time in *Calendar Days* - By PE List All *Liquidated Damages* and cite GR References - By PE Bid Date completed by PACD	**PE/PACD**	
3	**SCHEDULE OF WORK AND PRICES -** By PE Allowance items and fixed bid items should be separately footnoted. Identify all Specialty Items. Limit Mobilization Amount. There should be no unit price bids unless reviewed and approved by Management.	**PE**	
4	**Bidders Qualifications and Information** Signature Sheet and Affidavit Bid Bond List of subcontractors MBE/WBE List Employment & Training Policy Declaration	**PACD**	
5	**PROPOSAL - PART II** - Affirmative Action Section	**PACD**	
6	**PROPOSAL - PART III** - MBE/WBE Section	**PACD**	
7	**PROPOSAL - PART IV** - Instructions to Bidders For CM projects, include the following requests in the letter to Project Award & Control Division requesting the preparation of the bid proposal: a. Delete "Schedule of Stipulated Unit Prices" article. b. Delete the section "Opportunity to Partner." BOE policy is to not include this section. PE should check with management before including this section. c. Solid Waste Management Requirements	**PE/PACD**	

 Note: Check with Project Award & Control Division for projects under $100,000 as some of the above items are not applicable.

CHECK LIST FOR
SCHEDULE OF WORK AND PRICES

ITEM	DESCRIPTION	UNIT	BID AMOUNT	RESPONSIBILITY	USE Y/N
1	**MOBILIZATION (GR 1721)** THIS IS NOT AN ALLOWANCE ITEM but must be included in the Schedule of Work and Prices and completed by the Contractor. Do not burn-in number as done previously. Establish a maximum amount. **Action:**	LS		**CM**	
2	**ALLOWANCE FOR PERMITS (GR 1294)** Calculate approximate construction permits' costs from published tables. **Action:**	LS		**CM**	
3	**ALLOWANCE FOR RECOMMENDED SPARE PARTS (GR 1781)** This is in addition to the required spare parts listed in the technical specs. Use 2-3% of major equipment costs as an allowance for purchase of additional spare parts **Action:**	LS		**CM**	
4	**ALLOWANCE FOR STARTUP ASSISTANCE (GR 1750)** Amount is based on duration (typically 3 months), project complexity and number of trades likely to be involved. **Action:**	LS		**CM**	
5	**ALLOWANCE FOR CITY INSPECTION (GR 1453) -** Amount is based on number of major pieces of equipment believed to require one or multiple ConAd visits. May also include $$ for engineering trips for shop testing etc. **Action:**	LS		**CM/CON**	
6	**ALLOWANCE FOR OPERATIONS AND MAINTENANCE TRAINING** **Optional (GR 1820) -** Two options available (1) Training provided by the Contractor - included in the lump sum bid by the Contractor; and (2) Training by City personnel. If option (2) is selected, include an allowance line item for training by outside consultant in the event that City personnel are unable to perform training. Make it clear that this allowance is not for vendor training. **Action:**	LS		**PE/CM**	
7	**TECHNICAL MANUALS (GR 1782)** Optional - THIS IS NOT AN ALLOWANCE. PE uses this fixed bid item amount as an incentive for the	LS		**PE/CM**	

CHECK LIST FOR
SCHEDULE OF WORK AND PRICES

ITEM	DESCRIPTION	UNIT	BID AMOUNT	RESPONSIBILITY	USE Y/N
	Contractor to submit O&M manuals ASAP in support of CITY supplied training. **Action:**				
8	**ALLOWANCE FOR SURVEY (GR 1722)** This Article calls for City personnel to provide survey services to establish initial benchmarks. In some cases CITY Survey is also responsible for line and grade stakes for utility and street work. In the event that City personnel can not provide these services, then money is already available to compensate the Contractor for outside survey services. Include with this Article the paragraph explaining the allowance option. **Action:**	LS		**PE/CM**	
9	**ALLOWANCE FOR DIFFERING SITE CONDITIONS (GR 1253)** Previously used "potholing" allowance for unforseen conditions. Potholing of all utilities is required by the specs. This allowance is to cover potholing of other undocumented utilities and pay for cost of remedial actions. **Action:**	LS		**PE/CM**	
10	**ALLOWANCE FOR SITE OFFICE EQUIPMENT AND ENGINEERING SUPPLIES. (GR 1212)** - Confirm with ConAd whether they will need to be furnished with site office computer hardware and accessories. If yes, then GR 1212 needs to be modified to include this requirement. Does the CM need full time on site presence?? This allowance is also for the CM's office and for the CM to purchase field office equipment, reference specifications, etc. required for the job. **Action:**	LS		**PE/CM**	
11	**ALLOWANCE FOR SEWER BYPASS SYSTEM (GR 1563)**: This allowance shall be included for all wastewater projects with potential sewage spill. The allowance will cover all costs associated with Section B-1 through 9 of the **POLLUTION CONTROL - SEWAGE SPILL PREVENTION RESPONSE REQUIREMENTS** Article 1563 of the General Requirements. **Action:**	LS		**PE/CM**	
12	**ALLOWANCE FOR EQUIPMENT SUBSTITUTIONS FOR COMPATIBILITY PURPOSES (GR 1211)**	LS		**PE**	

CHECK LIST FOR
SCHEDULE OF WORK AND PRICES

ITEM	DESCRIPTION	UNIT	BID AMOUNT	RESPONSIBILITY	USE Y/N
	Avoid using unless there is specific equipment which the ENGINEER will insist on. Alternative is sole source prior to bid in which case a Board report is required. **Action:**				
13	**ALLOWANCE FOR GEOTECHNICAL SERVICES** Sometimes Geotechnical Services does not have sufficient personnel available to monitor excavation, shoring, backfill, etc. This allowance makes it possible for Geotechnical Services to hire one of their "On-Call" consultants. The Contractor then pays for these services through invoices approved by the Construction Manager. **Action:**	LS		**PE/CM**	
14	**ALLOWANCE FOR KNOWN BUT UNSCOPED WORK (GR __) -** Used only when design is not complete at bid time due to project urgency or pending investigation work by the contractor. Should be avoided whenever possible. This is likely to result in the need for a Board Report and higher "change order" pricing. If need, use GR - Article 60. **Action:**	LS		**PE/CM**	
15	**DEMOLITION WORK** (If Applicable)	LS		**PE**	
16	**SITE AND CIVIL WORK** (If Applicable)	LS		**PE**	
17	**ARCHITECTURAL WORK** (If Applicable)	LS		**PE**	
18	**STRUCTURAL/CONCRETE WORK** (If Applicable)	LS		**PE**	
19	**MECHANICAL** (If Applicable)	LS		**PE**	
20	**ELECTRICAL AND INSTRUMENTATION** (If Applicable)	LS		**PE**	
	TOTAL BID AMOUNT				

WW TREATMENT PLANT PROJECT
CONSTRUCTIBILITY REVIEW CHECKLIST

Project Name: **Project : CIP** **Project Phase :**

Reviewer: **Date:**

Q. CONSTRUCTIBILITY REVIEW	REF DOCUMENTS Specification / Drawing / Memorandum	COMMENTS
1. GENERAL:		
a. There is uniformity, continuity and a coordinated relationship between the plans and specifications. There are no conflicts between or among the documents.		
b. The drawings lead the reader from a general area to a precise location in a logical manner.		
c. Verify that Jobsite work rules and safety requirements are in G.R.S.		
d. Adequate details are provided so that the project can be constructed as shown on the drawings.		
e. All equipment and materials that are shown on the drawings are clearly and adequately identified on the drawings and described in the specifications.		
f. Make Sure the Utilities tie-in list includes scheduling window(s). Spell out who is responsible for any temporary facilities.		
g. Verify that Building and Safety plan check is complete for any permits required to construct and operate.		
h. Verify that responsibility for Operator and maintenance training (both		

WW TREATMENT PLANT PROJECT
CONSTRUCTIBILITY REVIEW CHECKLIST

Project Name: **Project : CIP** **Project Phase :**

Reviewer: **Date:**

Q. CONSTRUCTIBILITY REVIEW	REF DOCUMENTS Specification / Drawing / Memorandum	COMMENTS
operations and equipment) is clearly spelled out.		
i. Verify that the Emergency plan includes personnel and phone numbers.		
j. Verify that any required Guarantees and performance testing are spelled out. Verify whether or not performance testing is included in completion time.		
k. If Precommissioning and startup assistance are required, verify that manpower allocation and contract amount are adequate		
l. Verify that a Startup supply of spare parts and consumables is part of contract amount.		
m. Verify that Supply of initial changes of lubricants, chemicals, etc. are part of contract amount.		
n. For any potential street closures make sure the traffic plan requirements are listed in documents.		
o. Make Odor mitigation during construction the contractor's responsibility. List objective criteria.		
p. Include RESPA and SOPER forms, define procedure.		

WW TREATMENT PLANT PROJECT
CONSTRUCTIBILITY REVIEW CHECKLIST

Project Name: **Project : CIP** **Project Phase :**

Reviewer: **Date:**

Q. CONSTRUCTIBILITY REVIEW	REF DOCUMENTS Specification / Drawing / Memorandum	COMMENTS
q. Verify that Liquidated damages supporting calculations are in project files.		
r. Provide Fire Department access during construction - no blockage. If existing hydrants are to be moved or are inaccessible check with Fire Department for interim requirements.		
s. Make sure vibration and Noise abatement during construction is contractor's responsibility. List objective limits.		
t. In light sensitive areas restrict usage of high intensity floodlights.		
u. Verify inspection of soil after demolition of structures or equipment.		
v. Confirm scheduled preconstruction safety meeting.		
w. Reminder for submittal of non-UL equipment products components and devices.		
x. Determine who is supplying required survey. If City is supplying more than basic control, verify local City Surveyor has adequate resources.		
y. Verify that plant access requirements are clearly spelled out.		
z. Confirm that the laydown area is shown, including dimensions and		

Project Name: **Project : CIP** **Project Phase :**

Reviewer: **Date:**

Q. CONSTRUCTIBILITY REVIEW	REF DOCUMENTS Specification / Drawing / Memorandum	COMMENTS
coordinates: list time limits if applicable.		
aa. Verify who is responsible for temporary utilities. Confirm that requirements are reasonable. If using City supplies verify that the rate is defined for backcharge.		
ab. Determine if field office space is required for ENGINEER or INSPECTOR. Make sure Contractor is supplying if required.		
ac. Verify that all abbreviation and symbol lists are complete.		
ad. Confirm that the limits and coordination requirements with other contractors are defined, as well as time constraints.		
ae. Confirm that the separation between contractor precommissioning and Sanitation start up is defined. When is substantial completion?		
af. Confirm that the responsibilities and interfaces with owner furnished equipment are defined. When does it arrive? Who unloads & stores?		
ag. Verify that an assessment has been done for potential hazardous materials, such as Lead paint or Asbestos.		

WW TREATMENT PLANT PROJECT
CONSTRUCTIBILITY REVIEW CHECKLIST

Project Name: **Project : CIP** **Project Phase :**

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Q. CONSTRUCTIBILITY REVIEW	REF DOCUMENTS Specification / Drawing / Memorandum	COMMENTS
ah. Determine who has responsibility for haz mat disposal.		
ai. Verify that pertinent as-built drawings are incorporated in plan sets and are available for inspection by contractors.		
aj. The specified construction duration appears reasonable, and appropriate milestones are established to control contract activities.		
ak. The allowable construction timeframe, and work-shift interface coordinated with the existing plan operations, are properly specified.		
al. Verify that demo phasing and limits are clearly defined and that conditions are clearly spelled out. State where any salvage material is to be delivered.		
am. Verify that the timing of plans and equipment delivery for owner furnished equipment is spelled out. Determine that the delivery schedule supports the construction schedule with float.		
an. Verify if the limits of work for tie-ins are clearly defined.		
ao. Verify that there are milestones with liquidated damages for all important time limits.		
ap. Determine if the phrase “by others” is		

Project Name: **Project : CIP** **Project Phase :**

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Q. CONSTRUCTIBILITY REVIEW	REF DOCUMENTS Specification / Drawing / Memorandum	COMMENTS
used for work to be done by another general or the City.		
aq. Determine if intermediate milestones, the scope of the work to be included and the conditions for acceptance are clearly defined and time limits are listed in calendar days.		
ar. Determine if there is space on site for contractor's personnel to park. Are there limits on the number of vehicles? Are passes required? Verify with Sanitation liaison.		
as. Confirm that all CUP and Environmental Impact requirements have been incorporated into the plans.		
at. Determine that the ICRs are specific for this project.		
au. Verify that all the required GR sections are in the spec and that the unneeded sections are deleted.		
av. Determine if the level of the scheduling is appropriate for this project.		
aw. Verify that the allowance items show scope and dollar amounts. Discriminate between allowances. Required items that should be included in the Lump Sum. (I.E. Tech Manuals are required by Equipment Specs but an allowance		

Project Name: **Project : CIP** **Project Phase :**

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Q. CONSTRUCTIBILITY REVIEW	REF DOCUMENTS Specification / Drawing / Memorandum	COMMENTS
could pay for operations training manuals.)		
ax. Determine if there is a spec section for all material to be supplied.		
ay. Verify that every allowance item is explained, including mark ups.		
az. All work to be designed by the Contractor as part of a performance specification is properly specified, giving the minimum requirements for such properties as type, weight, size, thickness, materials of construction, strength, configuration, color, texture, life expectancy, rating, classification. Gas tightness, and other physical features and quantities.		
ba. Determine that all materials specified have been used on other projects. For items like roofing or fireproofing make sure they have a current LARR.		
bb. The specifications clearly define the criteria for acceptance and rejection of materials and equipment.		
bc. Determine if a “lock out/tag out” procedure is required. If so, put a copy of plant procedure in the Spec.		
bd. Visit the site and walk down the project.		

WW TREATMENT PLANT PROJECT
CONSTRUCTIBILITY REVIEW CHECKLIST

Project Name: **Project : CIP** **Project Phase :**

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Q. CONSTRUCTIBILITY REVIEW	REF DOCUMENTS Specification / Drawing / Memorandum	COMMENTS
be. Verify that Con Ad witnesses any required equipment storage maintenance. Verify that contractor submits a log or that Con Ad keeps one.		
2. SITE AND CIVIL:		
a. The survey data shown is clear, consistent and adequate.		
b. Verify that Contractor provides barricades as necessary to protect open excavations.		
c. Verify that all soils testing and compaction requirements are clearly specified.		
d. Verify that utility main runs are located outside the building footprint to avoid the critical path schedule conflicts.		
e. Verify that material types and sizes for existing utilities tie-ins are defined.		
f. Specify testing requirements.		
g. Verify that thrust blocks are shown.		
h. Confirm that the mix for asphalt pavement is specified.		

WW TREATMENT PLANT PROJECT
CONSTRUCTIBILITY REVIEW CHECKLIST

Project Name: **Project : CIP** **Project Phase :**

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Q. CONSTRUCTIBILITY REVIEW	REF DOCUMENTS Specification / Drawing / Memorandum	COMMENTS
i. Determine if existing lines are to be capped and abandoned or removed.		
j. Determine if temporary access roads are Paved or base. If permanent roads are concrete determine that finish is specified.		
k. Verify that Contractor submits shoring design compatible with geotechnical report recommendations.		
l. Verify that Dewatering submittal precludes moving any toxic plumes.		
m. Verify that the existing site conditions are adequately defined and that all existing utilities in the work area are shown on the plans.		
n. Verify that the geotechnical report is current, with test borings within the project boundaries.		
o. Verify that underground wall strength/bracing requirements for backfill are spelled out. Does the deck have to be placed prior to backfill?		
p. Confirm that all temporary shoring is removed at end of project.		
q. Verify that stainless bolts have been specified for underground applications.		
r. Verify that duct banks have been		

WW TREATMENT PLANT PROJECT
CONSTRUCTIBILITY REVIEW CHECKLIST

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Q. CONSTRUCTIBILITY REVIEW	REF DOCUMENTS Specification / Drawing / Memorandum	COMMENTS
checked for physical interference with sewer and storm drain.		
s. If repaving to match existing, make sure grades have been checked to eliminate bird baths.		
t. Require a predrill meeting with Con Ad, Contractor, Geotech and Engineer prior to drilling cast in place piles.		
u. Determine if soldier pile & tiebacks conform to special order 003-0201		

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CONSTRUCTIBILITY REVIEW CHECKLIST

Project Name: **Project : CIP** **Project Phase :**

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Q. CONSTRUCTIBILITY REVIEW	REF DOCUMENTS Specification / Drawing / Memorandum	COMMENTS
3. STRUCTURAL:		
a. Verify that depressions for various floor finishes are shown.		
b. Verify that slopes to all drains have been specified.		
c. Determine that various concrete finishes and curing are specified.		
d. Verify that equipment pad and anchorage layouts for all contractor supplied equipment were supplied. Determine dowel requirements.		
e. Verify that there are templates for structural steel anchor bolts. Confirm that fabricator verified prior to fabrication of base plates.		
f. Determine that sleeves and rebar trim are defined for penetrations.		
g. Verify that concrete for stair pans is specified.		
h. Verify that all expansion joints are dimensioned. Verify that Joint filler is specified.		
i. Verify that required control joints are shown.		
j. Determine that curb requirements are shown for containment areas.		

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k. Verify if masonry grout is required and specified.		
l. Determine if elevations are necessary to show the invert of roof and overflow drains.		
m. Determine if maximum grout lift is specified for masonry walls.		
n. Determine if shop primer is required for all structural steel not fireproofed.		
o. Verify clearances under beams with piping, drains, lights, etc.		
p. Determine if sloping is shown for sloping concrete slabs.		
q. Determine if sloping steel is required for roof. Most roofing systems require 2% at the cricket, so framing must be steeper.		
r. Verify that all exposed steel to be painted is identified.		
s. Verify that welding and anchorage requirements for metal deck perimeters are specified.		
t. Determine if building skin is attached to the metal deck edge, and if so, verify that the attachment is specified.		
u. Determine if there are any heavy wall mounted fixtures or equipment that may require structural gage studs.		

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CONSTRUCTIBILITY REVIEW CHECKLIST

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Verify that minimum stud gage is specified.		
v. Verify that stud walls are thick enough to accommodate flush mounted cabinets, toilet accessories, ducts, piping. Etc. Otherwise require 2 walls.		
w. Determine that anchor bolts are identified for owner furnished equipment and verify that material type is specified.		
x. Verify that ledger angles or channels are shown for window, door and louver support. Verify that perimeters are shown for metal deck slab.		
y. Verify that there are structural provisions for elevator guide rails.		
z. Verify that adequate platforms are specified for access to all equipment.		
aa. Verify that structural observation requirements are spelled out.		

WW TREATMENT PLANT PROJECT
CONSTRUCTIBILITY REVIEW CHECKLIST

Project Name: **Project : CIP** **Project Phase :**

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Q. CONSTRUCTIBILITY REVIEW	REF DOCUMENTS Specification / Drawing / Memorandum	COMMENTS
4. ARCHITECTURAL:		
a. Determine if roofing system requires insulation. Determine if minimum roof slope is compatible with roofing system.		
b. Determine if roof system requires vents.		
c. Verify that there is a full set of roof details for curbs, penetrations, flashing, parapets, cants, etc.		
d. Verify that there are adequate details and schedules for windows and doors.		
e. Verify that widths of masonry joints are specified. Determine if material samples and sample panels are		

Project Name: **Project : CIP** **Project Phase :**

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Q. CONSTRUCTIBILITY REVIEW	REF DOCUMENTS Specification / Drawing / Memorandum	COMMENTS
required.		
f. Verify that door and window frame anchorages are specified and confirm that fire rating requirements are listed.		
g. Verify that any required masonry testing is specified.		
h. Verify that there is adequate access for equipment maintenance/removal after walls are in.		
i. Verify that there are details for any required masonry penetrations.		
j. Verify that specified fireproofing is City approved and UL listed for our particular application.		
k. If there are any extensive stucco surfaces make sure expansion joints are detailed.		
l. Verify that plaster/stucco finish and sample panels are specified.		
m. Verify that all backing requirements are shown for bathroom accessories, cabinets, etc.		
n. Verify that coatings for all exposed surfaces are specified.		
o. Verify that roofing materials must arrive in original, unopened containers. Verify storage requirements and that a written		

Project Name: **Project : CIP** **Project Phase :**

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Q. CONSTRUCTIBILITY REVIEW	REF DOCUMENTS Specification / Drawing / Memorandum	COMMENTS
guarantee is specified. Roofing applicator must accept surface in writing prior to starting work. Determine if Class A or B roof. Verify that installer is licensed by manufacturer and verify that System has a RR number.		
p. Determine whether or not skylight materials are subject to yellowing or UV damage.		
q. Verify that there is a provision for skylight condensate drainage. Verify that flashing, caulking and sealing are specified.		
r. Determine if roof insulation substitutes for ceiling insulation, especially if you switch from a single ply to a built up roof.		
s. Confirm that Specification precludes asbestos material.		
t. Verify that all surfaces to receive water/damp proofing are identified and that the materials have a RR number.		
u. Verify that caulking, joint filler, fire safing,etc. arrived at job site in original unopened containers. RR number for fire safing.		
v. Verify that shop priming and painting of metal doors, windows and frames is specified.		

WW TREATMENT PLANT PROJECT
CONSTRUCTIBILITY REVIEW CHECKLIST

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Q. CONSTRUCTIBILITY REVIEW	REF DOCUMENTS Specification / Drawing / Memorandum	COMMENTS
w. Verify that fire rating is specified for all doors.		
x. Determine if hollow metal frames are to be grouted. Determine if frame thicknesses are compatible with walls.		
y. Verify that caulking and sealants for glazing are specified. Determine if wire glass is required for fire code.		
z. Determine if screws in aluminum frames are countersunk and flush.		
aa. Verify that keying requirements are specified.		
ab. Painting Sub to inspect drywall surfaces and accept in writing prior to starting work. Require first coat to be a shade lighter so you can verify coverage on multiple coats.		
ac. Determine if thin set or mortar set tile is specified.		
ad. Verify that water resistant board is specified at all damp areas.		
ae. Verify that full height walls are specified at fire barriers.		
af. Verify that masonry walls are thick enough for recessed fixtures, piping, etc.		

WW TREATMENT PLANT PROJECT
CONSTRUCTIBILITY REVIEW CHECKLIST

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Q. CONSTRUCTIBILITY REVIEW	REF DOCUMENTS Specification / Drawing / Memorandum	COMMENTS
ag. Determine if supports are required for ceiling hung partitions.		
ah. Verify that all materials specified have required LARR numbers or UL listings		
ai. Verify that there are objective specifications for all material finishes.		
aj. Verify that all materials listed on the finish schedule are specified.		
ak. Determine if all concrete surfaces are to be coated.		
al. Verify that the first 9' in public areas has Anti-graffiti coating.		
5. MECHANICAL:		
a. Determine if HVAC spec spells out painting and coating requirements for duct work. If duct is galvanized paint inside vents at eye level.		
b. Verify that HVAC contractor must lay out equipment to provide access to all panels.		
c. Verify that HVAC spec shows required separation of low voltage control from power supply, just like		

Project Name: **Project : CIP** **Project Phase :**

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Q. CONSTRUCTIBILITY REVIEW	REF DOCUMENTS Specification / Drawing / Memorandum	COMMENTS
electrical spec.		
d. Confirm coordination of underground plumbing with site utilities and structural work to eliminate interferences.		
e. Determine who is responsible for HVAC control design. If engineer, verify that conduit and wire are shown.		
f. Specify responsibility for fire system design and coordination with other equipment. Verify that remote monitoring is specified. Verify that fire system is coordinated with electrical and HVAC.		
g. Verify access to fire water system shut off valves.		
h. Determine who is responsible for pipe support design. Verify that city designed supports are shown clearly.		
i. Verify that two vendors or equal are listed for all equipment per State Law.		
j. Verify that all equipment is located.		
k. Verify that there is adequate access for maintenance and operation of all equipment.		
l. Verify that acceptable installation criteria are defined. Determine that the		

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Q. CONSTRUCTIBILITY REVIEW	REF DOCUMENTS Specification / Drawing / Memorandum	COMMENTS
vendor rep is required to accept installation in writing.		
m. Verify that training requirements and provisions are clearly defined.		
n. If "Availability" is in the spec, verify that it is defined.		
o. Verify that the specs define the "occupancy" code for the structure.		
p. Verify that "dipped and baked Heresite" coating is specified for cooling fins.		
q. Verify that there are no expansion anchors for Overhead Hangers.		
6. PIPING:		
a. Verify that roof drains are routed to avoid interference with building exterior skin and handicap access sidewalks.		
b. Verify that there are adequate details to route the piping.		
c. Verify that the material type for bolts and studs has been specified for all		

WW TREATMENT PLANT PROJECT
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Q. CONSTRUCTIBILITY REVIEW	REF DOCUMENTS Specification / Drawing / Memorandum	COMMENTS
line classes.		
d. Verify that hangers are specified or that design criteria is clear. Make sure design responsibility is clear for any hangers not detailed.		
e. Verify hydro test pressures are specified. Check if Valves & Instruments are to be isolated for the test.		
f. Verify that air/ IA tubing cleanliness and blowing/drying requirements are in spec.		
g. Verify that it's clear what pipe gets painted? Colors? Contacts with supports? System?		
h. Determine if vents and drains are required at high and low points.		
i. If you have provision for a future extension, think about a valve before the blind.		
j. If you do anything to fresh water, make sure you include the requirements for flushing, chlorination and testing.		
k. Verify that any required insulation is clearly specified. Is insulation protection required?		
l. Verify that Yard pipe is above sewer.		

WW TREATMENT PLANT PROJECT
CONSTRUCTIBILITY REVIEW CHECKLIST

Project Name: **Project : CIP** **Project Phase :**

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Q. CONSTRUCTIBILITY REVIEW	REF DOCUMENTS Specification / Drawing / Memorandum	COMMENTS
7. ELECTRICAL:		
a. Verify that mounting heights of all outlets are specified.		
b. Separate control conduit from power.		
c. Verify that below grade conduit is below slab to allow PVC conduit.		

WW TREATMENT PLANT PROJECT
CONSTRUCTIBILITY REVIEW CHECKLIST

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d. Verify that No conduit for power greater than 120V embedded in slabs		
e. Verify that Duct bank concrete is red throughout mix, not just surface powder.		
f. Verify that strength of duct bank and electrolier concrete is specified.		
g. Verify that conduit routing requirements are clearly defined.		
h. Verify that duct bank rebar and grounding are shown. Ground wire in each conduit.		
i. Verify that training requirements and provisions are clearly defined.		
j. Verify that a short circuit study has been done to justify the breaker interrupting current rating. Determine who is responsible for doing the study.		
k. Verify that top or bottom panel feed is coordinated with conduit routing and structural interferences.		
l. Verify that all electrical equipment has been sized to make sure we're not trying to put 10 pounds in a 5 pound bag - 3' Frontal Clearance.		
m. Verify plastic conduit duct bank grounding.		

WW TREATMENT PLANT PROJECT
CONSTRUCTIBILITY REVIEW CHECKLIST

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n. Verify that ICRs contain info for coordinating new construction with existing plant operating requirements. Sanitation electrical tie-in make sure requirements are included in the spec.		
o. Verify that building area is properly identified (Class I DIV 2).		
p. Verify that tin buses are specified for new switchgear at Hyperion, no silver or copper.		
q. Verify that non-encased conduit in a roadway has to be at least 30” below finish grade.		
r. Verify that drip shields are required over any electrical equipment with pipes overhead.		
s. Verify that the requirement for conduit and wire tagging is included.		
t. Verify that UL or City test lab approved electrical equipment is used.		
u. Verify that conduit is shown or define responsibility for miscellaneous power supplies. Space heaters, solenoid valves, lights and convenience outlets in panels, etc.		
v. Verify that acceptable PVC coated rigid conduit is clearly defined. There are only 2 acceptable suppliers that we know of.		
w. Verify that For NEMA 4X, stainless or		

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fiberglass is specified.		
x. Verify that requirements for continuity and ground testing are clear.		
8. INSTRUMENTATION:		
a. Verify that training requirements and provisions are clearly defined?		

WW TREATMENT PLANT PROJECT
CONSTRUCTIBILITY REVIEW CHECKLIST

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b. Determine who is doing DCS programming. If Sanitation, put in an allowance to pay an outsider when the SAN folks get too busy.		
c. Verify that control set points are given.		
d. Verify that loop check requirements are clear.		
e. Determine who is designing fire controls and ties with HVAC.		
f. Make sure there are provisions for Air purging/Nitrogen purge of control panels.		
9. MISCELLANEOUS:		
a. Verify that guarantee and/or performance testing requirements		

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are clearly defined.		
b. Verify that there was required testing prior to core drilling for conduit or piping (eliminates cutting reinforcing or embedded conduit).		
c. Verify that all equipment to be salvaged is clearly identified. Make sure Sanitation wants it. Make sure the location for drop-off is specified.		

WW Conveyance System Project
Constructability Review Checklist

Project Title:_____

Reviewer:_____ **Date:**_____

Design completion:
___Preliminary
___50% ___90%

General Checklist (Applies to all projects)

Item	Check	Item Description	Reviewer's Note
1	☐	For project larger than $10M, review UPRS to make sure CTCM budget is available and adequate.	
2	☐	Make sure project is using BOE latest standard GCs and GRs. Exclude Part 1 of SSPWC. (Check Note section on R- sheet)	
3	☐	All abbreviation and symbol lists are complete. All abbreviations used on plan set are in R-drawings and in GRs.	
4	☐	Drawings are in logical order from General view to details	
5	☐	Check if pertinent as-built drawings are incorporated in plan sets or are referenced for contractors to check out from the Vault.	
6	☐	Check if Emergency Sewer Repairs were performed in the area.	
7	☐	Adequate details for construction.	
8	☐	Clearly identify the limits of the contract, interfaces with ex. facilities and other contracts work. Depiction of new work and existing facilities is correct.	
9	☐	Locations, elevations, slope of all sewer and MHs specified are clearly shown in the drawing set.	
10	☐	Check existing sewer elevations. Old as builts may not reflect the National Geodetic Vertical Datum of 1929.	
11	☐	All HC's are indentified and properly shown in the contract documents.	
12	☐	Material types and sizes for existing sewer and MHs, bedding cases for piping, are properly defined.	
13	☐	The plans and specs clearly address details and requirements for the physical connection to and interface with the existing sewer and MHs.	
14	☐	The portions of existing sewer and MHs to remain or to be abandoned are clearly identified. Abandonment procedure is addressed.	

15	☐	Existing line to new MH connection, or new line to existing MH connection - provide a flex joint or call out the standard MH plan.	
16	☐	The exact tie-in location/elevation has been verified during design. Require contractor to verify the location/elevation before start laying the pipe.	
17	☐	Check provisions for future sewer tie-in. (Bulkhead or adequate room to install a balloon)	
18	☐	If stop logs are to be supplied, verify the material required is available for a reasonable price. California Heart Clear Redwood is the preferred material, but may not be available for the dimensions required and may be cost prohibitive, especially at large quantity. A different grade (Construction Heart Redwood), while the structural capacity and rot resistence are different, may be considered.	
19	☐	Verify the storage of the stop logs and the accessibility to remove the stop logs from the MH are acceptable to BOS.	
20	☐	Is bypass necessary? By pumping or gravity (in-line bypass)? Provide Hydrograph (for sewer 15" and larger), range of flow rate and requirements for bypass. If there are significant flows added to the sewer from one end to another, give flow data for at least one MH near the downstream end.	
21	☐	Hydrograph: Provide current hydrograph for sizing bypass system. (If information is older than 3 year, new gauging should be requested) Request the designer to verify the current flow.	
22	☐	Individual lateral bypass is specified when water service to the individual property (apartment, restaurant, hospital, etc.) can not be shut off. Multi-story buildings are specifically identified and addressed.	
23	☐	Survey data (coordinates and elevation of reference points) shown on plan is clear, consistent, adequate and updated. Field visit to verify the alignment (ask for survey if necessary)	
24	☐	For street resurfacing, existing pavement thicknesses and the restoration requirements are spelled out.	
25	☐	Existing site conditions are adequately described and the plans of existing sewers, utilities are shown on the plans. Include overhead utilities on the plans when they may have interference with construction equipment.	
26	☐	Verify designer has checked the location of the underground utilities.	
27	☐	Verify utility coordination (GR 01711 Summary of First Notice). Check utility interferences in the excavation area.	
28	☐	Verify the accuracy of the locations of utilities when they are close to MH and structures. Consider the room required to construct the structures. Pothole if necessary.	
29	☐	Check whether any interfering existing utilities are relocated or scheduled to be relocated. Verify that there is adequate room between utilities for any required shafts or pits. Otherwise have a plan in place to have the utility moved in time to support the construction schedule.	
30	☐	Check for compliance with DHS separation standards between sewers and water lines. (Title 22, Chapter 16, Section 64630, 64572)	

31	☐	In addition to the sewer plan, soil boring logs where excavation will take place are shown on the profile or on separate sheet with clear references.	
32	☐	Check uniformity, continuity, and a coordinated relationship between the plans and specifications. Especially check for consistency among Civil, Structural and Geotechnical plans/report. Any geotechnical "recommendations" necessary to protect adjacent improvements must be spelled out as "requirements."	
33	☐	All expansion joints are dimensioned, joint filler is specified, and required control joints are shown.	
34	☐	Water stop is shown for underground joints.	
35	☐	Constructability reviewer has walked through the proposed project sites and taken lots of photos.	
36	☐	New pavement, trench marks found during walk through are noted and transmitted to design engineer for investigation.	
37	☐	Construction access to the site is available	
38	☐	Excavation does not block private driveway, business access or emergency access. Ensure no discrepancy between the site condition and the plans (Site visit required). If it can't be avoided provide mitigation measures.	
39	☐	A) Adequate space is provided for sewer construction. B) Check available space for construction activities vs. traffic control. C) Check for emergency access. D) Check for overhead clearance under power lines (10' clearance 360 degree around) if crane will be used or piles to be driven.	
40	☐	Work site traffic control plans (A) are provided (B) approved by DOT (C) provide adequate work space. If approved traffic control plans are not available: (A) the criteria for the traffic control plans, allowable disruptions to existing striping and signals, are listed and provide adequate work space (B) contractor is required to get the plans designed/stamped by a licensed traffic engineer (C) contractor is required to obtain DOT approval, (D) this can be a bid item. and (E) Contractor is made aware of the time needed in DOT review and revision process	
41	☐	The General Notes may state that work can start 5 days after the approval of the traffic control plan. The DOT approved plan may state that work can start 15 days after the notification to DOT. Verify the consistency of these two places.	
42	☐	SSPWC Part I is not part of the specs. So the Mayor's Rush Hour Work Restrictions are not part of the specs unless specifically added to the General Notes.	
43	☐	All equipment and materials that are shown on the drawings are clearly and adequately identified on the drawings and described in the specifications.	

44	☐	The specified construction method is compatible with soil conditions, site environment, and traffic conditions. When necessary, spell out minimum shoring requirements.	
45	☐	Material specified complies with City approved Pipe and Sanitary Sewer Products and can be manufactured.	
46	☐	Pipe material evaluation requirements and analysis methods are included in contract documents. Pipe connections are acceptable.	
47	☐	The specifications define clearly the criteria for acceptance or rejection of materials, equipment and acceptable level of cleanliness.	
48	☐	Inspection requirements for testing and for work done in phases and for partial acceptance of the work (benefical use) are properly specified if needed.	
49	☐	Procedures for partial completion and project closeout are clearly specified.	
50	☐	A) The plans and specifications address space for the Contractor, inspector, and engineer's field office, operations. B) laydown, parking and storage C) or place responsibility for such provisions on the Contractor. (extra time will need to be allowed to secure spaces)	
51	☐	Include coordination requirements from owner and other Departments.	
52	☐	Work inside Department of Rec & Parks or other Departments/Agencies properties were coordinated, permit secured and included in bid document, area and access clearly marked. Endangered species (protected trees, for example) are identified.	
53	☐	Does the existing landscaping need to be protected? If replacement is necessary, are minimum specimen sizes clear? Is there any rare plant involved?	
54	☐	Permit is in place if trees are to be removed during construction.	
55	☐	Large trees should be identified on the plans and notes on tree trimming added (or require a pre-bid job walk where they can be pointed out.) If sewer alignment is close to trees, low hanging branches may interfere with construction activities.	
56	☐	Requirements from Railroad authority are included where construction activities cross the rail road tracks.	
57	☐	Requirements from CalTrans are included where construction activities cross State Highways.	
58	☐	Applicable constraints or special requirements regarding demolition, phasing, and sequencing of the work are complete, logical, and clearly identified.	
59	☐	If project requirements dictate, is the sequence of construction spelled out? Are there liquidated damages for any necessary intermediate milestones?	
60	☐	Check status of all essential permits. Ensure construction easement and entry permit are available for construction. Include permit requirements in the specifications.	

61	☐	Note structures on or near the easement in the way of construction work.	
62	☐	If HC work is needed under the jurisdiction of LADBS, requirements of permit is clear. (LADBS only allows C-36 contractor to pull permits. Pipe material and construction methods are also restricted.)	
63	☐	Address responsibilites and fees for permitting application	
64	☐	Specify work hours in residential area and school zones to minimize community impacts.	
65	☐	Check night permit requirements. Night permit, if required, is attainable. Permit may not be easily obtained for residential areas or if it is close to sensitive recepticals (hospital, hotel, etc.).	
66	☐	Check GR 01321, scheduling requirements to match project needs. Check for constructability within specified time frames. For project over $3M, use the moderate schedule version regardless of the perceived simplicity.	
67	☐	Check holiday street restriction has been addressed.	
68	☐	A) Lead time of manufacturing special pipe material or construction equipment, B) holiday construction restrictions and C) wet season factors accommodated by the allowed construction duration.	
69	☐	A) Schedule constraints such as Settlement Agreement date, B) rush hours construction restriction, C) holiday excavation restriction, D) newly resurfaced street restriction should be 1) spelled out by the contract and 2) can be achieved within the given construction duration. (References: Items B and C can be found on NavigateLA. Item D check Street Damage Restoration Fee under BOE Tech Doc Tools.)	
70	☐	The construction duration specified is _____ calendar days. Verify if this takes into account the required submittal, approval and procurement duration. When there are significant potential regulatory penalties for late completion, build in 3 months float per year of construction. (All projects should be calendar day contracts.)	
71	☐	Minimize use of the phrase "by others" in the plans and specifications. If necessary, define the responsible party.	
72	☐	Additional specifications not addressed in Greenbook/Brownbook are included in GR and Technical Specifications.	
73	☐	All required GR sections are in the specifications, all unneeded sections have been removed and GR Table of Contents marked "Not Used" for the removed sections. GRs 01112, 01120, 01140, 01212, 01280, 01292, 01312, 01711, and 01732 have been rewritten specifically for this project.	
74	☐	Consider using GR 01351 Escrow Bid Documents for project over $5M.	
75	☐	Avoid sole sourcing of material or construction equipment if possible. Special procurement procedures and longer waiting period might be needed for sole sourcing. Board approval of sole sourcing is in place. (Otherwise, list a minimum of 2 products, followed by the phrase "or equal".)	

76	☐	Geotech Report should be part of the documents to be reviewed. Check for soil type, groundwater table, existence of boulders, contamination, etc. against specified construction method.	
77	☐	Very hard rocks and pockets of oil have been encountered on Beverly Blvd in the West Lake area. Frequent soil borings on the sewer alignment are recommended for projects in this area.	
78	☐	Review Geotechnical Report. Soil boring and groundwater table information should be provided for any excavation work. "Perched water" is defined. Type of soil predicted is supported by the borings.	
79	☐	A) All geotechnical testing, compaction and inspection requirements are clearly specified. B) Geotechnical Report is compatible with Civil design and Structural design.	
80	☐	Review Geotechnical Report. Has due diligence testing for contaminated/hazardous material and groundwater been done?	
81	☐	Groundwater discharge location, infiltration rate, and sewer capacity in the area has been determined. Sewer capacity is adequate and has been coordinated with BOS.	
82	☐	Dewatering should be restricted to the minimum. Dewatering submittal must preclude disturbing any contaminated/toxic plumes.	
83	☐	Provide water information/sample for NPDES application for Storm Drain discharge.	
84	☐	Request that the shoring design is compatible with geotechnical report parameters, recommendations and indicates that temporary shoring shall be removed.	
85	☐	Type of shoring shall not interfere with excavation and/or pipe installation. Pile hole is defined. Pile installation is adequately detailed. Backfill of pile holes is spelled out. Pile deflection criteria and monitoring are spelled out. If vibration is allowed, specify monitoring requirements.	
86	☐	A pre-drill meeting with the contractor, Con Ad, Geotech, and the project engineer prior to drilling cast in place piles is specified.	
87	☐	Cast-in-drilled-hole piles (Tech specs 2372 and Geotechnical report): If the geotechnical engineer thinks casing is needed to drill the holes for the cast-in piles, make sure the language is tight. (For example: Casing shall be used to support the sides of the pile excavation. If the contractor chooses to attempt other methods for supporting the sides of the excavation, the process change must be approved by the Engineer. Approval of alternative methods shall be completely at the discretion of the Engineer. Disapproval of any proposed method other than casing shall not be grounds for any additional cost to the City.) Geotechnical report shall be clear that anything other than casing is completely the contractor's risk.	
88	☐	Specify requirements for community meeting, public notice, construction signs, and public relation issues.	
89	☐	GR section 01150 spells out requirements for storage of equipment and material in public right of way.	

90	☐	A) Requirements for dust, noise, vibration, odor control. B) Procedures and criteria for abatement of all known or suspected environmental impacts during construction are appropriately specified and adequately detailed.	
91	☐	If odor control is needed during construction, provide odor reading data, treatment guidelines and criteria for scrubber operation and AQMD permit requirements. Master specs section 13470 is used and tailored to project needs. Clearly spelling out concentrations allowed at work boundaries. Specify that odor monitoring is carried out by an independent Industrial Hygienist, not by the contractor's own staff.	
92	☐	If utility outages or street shut downs are required, are the maximum allowable shut down time defined? (Community and traffic impacts)	
93	☐	Verify all CUP and/or environmental impact requirements been included in the specifications. Verify if there are any special requirements to mitigate community impacts.	
94	☐	Project specific requirements by DOT, Street Lighting, Street Improvement are provided. Contractor is responsible for those provisions.	
95	☐	CCTV is required before and after construction for sewer rehabilitation. CCTV may be required after installation of new sewer, if air test is not practical.	
96	☐	Post-installation testing for acceptance is specified.	
97	☐	All bid/allowance items are clearly specified. Allowance items listed on the "Schedule of Work and Prices" match specs.	
98	☐	The total value of all allowance items is less than 4% of the Class A cost estimate. (Per WW Director, 2007)	
99	☐	Check GR 01721 Mobilization to make sure purchase of laptops, fax machine, softwares, cameras, cell phones, video cameras, etc. are NOT specified. (See Special Order 008-1204, dated 12/22/2004) But leave the money in the allowance.	
100	☐	Check allowance for Engineer/Inspector field office & supplies.	
101	☐	Allowance for Differing Site Conditions is reasonable. Risk of DSC is higher in older, hilly areas as the substructure info may not be complete.	
102	☐	Sufficient allowance for Partnering ($100/quarter in-house sessions or $9,000/quarter using outside facilitator.)	
103	☐	Allowance for Residential Service or Neighborhood Impacts Mitigation, if needed beyond what GR specified, is defined.	
104	☐	Allowance for transportation and disposal of bio-contaminated sewer debris. (Prefer using regular bid item with estimated quantitiy)	
105	☐	Allowance and handling procedure should be addressed for any potential (petroleum/heavy metal) contamination. (Prefer using regular bid item with estimated quantitiy)	
106	☐	Rough check the cost estimate quantity for glaring errors. Check unit and unit cost.	

107	☐	Pipe bedding case should be spelled out on the "Schedule of Work and Prices". Do not mix different cases together in a single bid item.	
108	☐	All contact phone numbers listed should be updated.	
109	☐	Check how the 3-phase construction power will be provided, if applicable (tunneling operations, large sewer rehab, pipe jacking, etc.)	
110	☐	GR 01722 is clear on who is doing the construction survey.	
111	☐	Verify that City Survey has adequate staff to support the project during the construction.	
112	☐	Identify who is responsible for temporary utilities (for construction use and to provide for communities impacted by the construction).	

Major and Minor Sewer Rehabilitation Sub Checklist

Item	Check	Item Description	Reviewer's Notes
1	☐	Check for the extent of existing concrete encasement over the sewer to be removed & replaced.	
2	☐	Check for existing sewer tunnel construction/show wood laggings	
3	☐	For partial demolition of existing sewer structures, require Contractor to submit demolition procedure acceptable to the Engineer.	
4	☐	Require pit shoring piles to be minimum 2 feet away from the existing sewer concrete footing.	
5	☐	Require pit shoring piles to be minimum 3 feet away from the sewer constructed in tunnels.	
6	☐	Project provided sewer access points are clearly defined.	
7	☐	Check location of the existing MH that needs to be rehabilitated or abandoned. Right of entry and other requirements are provided if it is inside a private property or a park/city yard.	
8	☐	The dimensions of existing sewers are not uniform. Check for sufficient room to accommodate variance by the proposed rehab methods. For large projects, require design to verify dimensions, sewer debris level, and MH condition (CISCO is a recommended option).	
9	☐	Verify the size and condition of existing sewer MHs have been reviewed during design and requirements for rehab are provided, if needed.	
10	☐	MH inner covers and/or pressure covers are often specified for large sewers. Verify MH sizes against standard plans. Design details shall be provided if not covered by standard plans. The condition of the existing MH frames should be verified; corroded frames need to be replaced.	
11	☐	For sewer debris disposal, provide dewatering requirements and specify the test method to arrive at the dry weight we pay for.	
12	☐	Verify handling of hazardous sewer debris is clearly defined.	
13	☐	Check Geotechnical Report. For shoring, specify beam and steel plate where required. Disallow trench boxes only where project conditions dictate. For deep trench excavation (over 25') consider sheet piling shoring system and what installation method is acceptable.	
14	☐	For soil grouting above or near the existing sewer, provide requirements to periodically monitor existing sewer MHs and sloped areas for grout leak into sewer or out of ground during soil grouting operations.	
15	☐	Check provisions are provided on how to deal with existing ground water.	
16	☐	For sewer odor control, verify in addition to H2S, provisions to control Mercaptans and VOCs are also included.	

17	☐	For sewer odor monitoring, require the certified Industrial Hygienist be a 3rd party personnel (hired by the Contractor, qualification acceptable to the Engineer, and reports to the Engineer)	
18	☐	Ensure specific noise monitoring and control plans are provided.	
19	☐	Verify noise barrier walls size and thickness are specified and are adequate through out the project sites.	
20	☐	Review construction impacts to the community residents and ensure mitigation measures are provided.	
21	☐	Major sewer diversion to facilitate construction often create major challenges to BOS operations. Design shall be clear what diverting scenario is NOT allowed. Verify that design manager has obtained written approval from BOS management on specific flow diversion.	

Microtunneling Sub Checklist

Item	Check	Item Description	Reviewer's Notes
1	☐	Laydown and shaft sites area are clearly identified, dimensioned, marked and referenced.	
2	☐	Verify utility interference at the shaft locations. Consider the extra room needed to construct the shaft.	
3	☐	Check for accessibility of shaft locations.	
4	☐	Verify that pipe material and size are (1) suitable for the ground (soil) conditions, length of the drive, and jacking force, and (2) the specified pipe (material & size) is available.	
5	☐	Verify the designer has accounted for the minimum ground cover for Microtunneling.	
6	☐	Check for Technical Specification of the Microtunneling machine	
7	☐	Project GBR is provided.	
8	☐	Provide geotechnical soil boring at the shaft sites.	
9	☐	Are there tolerances for the horizontal and vertical alignment? Are there methods of control of the alignments?	
10	☐	Provide adequate clearance between tunneling machine and existing utilities.	
11	☐	Provide requirement for the microtunneling machine break-in and break-out.	
12	☐	Verify the local power utility can support schedule requirement.	

Tunneling Sub Checklist

Item	Check	Item Description	Reviewer's Notes
1	☐	For closed face, double pass machine, minimum tunneling size of 13' diameter is recommended.	
2	☐	Laydown area and shaft sites are clearly identified, dimensioned, marked and referenced.	
3	☐	Identify sequence of the MH base and tunneling.	
4	☐	Clearly mark and identify shaft locations (drive and retrieval).	
5	☐	Accessibility of shaft locations.	
6	☐	Check shaft inside size is sufficient for the machine. Check shaft laydown area is sufficient for personnel, equipment, trucks, etc.	
7	☐	Verify utility interference at the shaft locations. Consider the extra room needed to construct the shaft.	
8	☐	Check major utility lines crossing and parallel with the tunnel project for interference. Request pothole during design phase, if necessary. (Waiting for contractor to pothole may be too late.).	
9	☐	Are there tolerances for the horizontal and vertical alignment? For both initial ground support and carrier pipe?	
10	☐	Provide adequate clearance between tunneling machine and existing utilities.	
11	☐	Check for Technical Spec. of the tunneling machine.	
12	☐	Check for Technical Spec. of tunnel primary support.	
13	☐	Check for Technical Spec. of the backfill grouting.	
14	☐	Check for Technical Spec. of the permeation grouting.	
15	☐	Check for Technical Spec. of the contact grouting.	
16	☐	Check for Technical Spec. of the shaft excavation support.	
17	☐	Check for Technical Spec. of the annular grout.	

18	☐	Project GBR is provided.	
19	☐	Provide geotechnical soil boring at the shaft sites.	
20	☐	Evaluate carrier pipe material for ease of installation.	

Facility Sub Checklist

Item	Check	Item Description	Reviewer's Notes
1	☐	Is there adequate ingress/egress for large vehicles? Adequate emergency egress?	
2	☐	Any overhead obstructions that would prevent construction equipment, crews from accessing area? (power lines, protected trees)	
3	☐	Adequate site drainage? Check slope, interferences, existing drains, spillways, swales, etc.	
4	☐	If regrading a paved area, pothole to determine existing pavement component thickness. If a large area is disturbed, new pavement thickness should be specified.	
5	☐	Will large pieces of equipment fit through the building doors? Is there adequate clearance in the building for equipment replacement/service/maintenance?	
6	☐	Does specified equipment meet LADBS area classification requirements?	
7	☐	Custom items cost more. Specify "off-shelf" equipment whenever possible.	
8	☐	Does specified equipment exceed noise threshold limits?	
9	☐	Are materials specified in contract approved by LADBS? (i.e. ductile iron pipe is not allowed for potable water.)	
10	☐	Does plumbing comply with LAMBC? (Available on LADBS website.)	
11	☐	Fire alarm, smoke detector system are State Fire Marshall, LADBS, LAFD, NFPA approved?	
12	☐	Main power - Sufficient space and design for LADWP to pull wires/power drop.	
13	☐	DWP transformer - Sufficient quantity/spacing of traffic bollards? Follow DWP specs.	
14	☐	Underground telephone and the main power feed have adequate clearance. 12" between telephone conduit and power line concrete encasement.	
15	☐	Sufficient steel reinforcement at foundations, aprons, equipment pads.	
16	☐	Sufficient coating system on structural steel. Check SED's recommendations.	
17	☐	Drain lines are shown on all plan sheets showing foul air ducts. Must also call out drain line details.	

18	☐	Drain lines present at all low points of foul air ducts. Drains at particulate filter, demister, degreaser?	
19	☐	Bolt patterns for tank flanges consistent with air duct flanges?	
20	☐	Adequate support for light poles/fixtures at upper deck levels?	

WASTEWATER CONVEYANCE PROGRAM
CONSTRUCTIBILITY REVIEW COMMENTS & RESPONSES

PROJECT TITLE: **W.O.:**

REVIEWED BY (CM/GM): **DATE:**

RESPONDED BY (PE/PM): **DATE:**

ITEM NO.	REF CR CHECKLIST	REF PLANS/SPECS	COMMENTS (by CM/GM)	RESPONSES (by PE/PM)
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ITEM NO.	REF CR CHECKLIST	REF PLANS/SPECS	COMMENTS (by CM/GM)	RESPONSES (by PE/PM)
15				
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