
PART 1 GENERAL**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This section describes the general requirement associated with the Aerial Tramway system and includes:
 1. System Description
 2. Reference Standards
 3. Required Submittals
 4. Quality Control
 5. Coordination
 6. Acceptance Testing
 7. Operation and Maintenance Support
 8. Spare Parts
 9. Warranties
 10. Contract Closeout
 11. Substitutions
 12. List of Drawings
 13. Design Criteria
 14. Design Life

1.3 RELATED SECTIONS:

- A. 34 14 14 Aerial Tramway Ropeway Equipment
- B. 34 14 15 Aerial Tramway Electrical

1.4 SYSTEM DESCRIPTION

- A. The purpose of the project is to install a single reversible aerial ropeway (ropeway) transporting passengers from the plaza of the Transbay Tower to a Park on top of the adjacent Transbay Transit Center. The Transbay Tower is being developed at 101 1st Street, San Francisco, California. The OWNER is Transbay Tower LLC. The ropeway shall utilize an alignment as shown on the Drawings. OWNER has completed a preliminary reference design as in the Drawings. SYSTEM SUPPLIER shall provide all equipment shown on the drawings and detailed in the specifications FOB site of the work as well as technical assistance specified.
- B. With consideration of the specifications, the ropeway system shall be designed to operate at a maximum speed of 250 fpm (1.25 mps). The ropeway carriers and all system components shall be designed for a carrier capacity of 25 passengers considering the space allocation as defined in the reference standards, each weighing 170 pounds. The drive equipment shall be located at the Lower Station. The primary and auxiliary power shall be provided by the OWNER.

1.5 REFERENCE STANDARDS

- A. The primary reference standards for the Project are listed below. The ropeway system shall conform to all applicable requirements of these documents including codes and standards referenced therein.
- B. When the drawings and specifications call for materials of construction of better quality or larger size than required by codes, laws, rules and regulations, the drawings and specifications shall take precedence. If the drawings and specifications differ, the specifications shall take precedence.
 1. ANSI B77.1 – 2011
 2. California Building code title 24 part 2
 3. FEDERAL OSHA PARTS 1910 & 1926
 4. CAL/OSHA TITLE 8, CHAPTER 4, SUBCHAPTER 6.1
 5. NATIONAL ELECTRICAL CODE, NFPA 70-2011
 6. MINIMUM DESIGN LOADS FOR BUILDINGS, ASCE 7-10

1.6 REQUIRED SUBMITTALS

- A. Submit the following according to Conditions of the Construction Contract and Division 1 Specification Sections.
- B. The SYSTEM SUPPLIER shall supply all general arrangement, shop drawings and component drawings, as required by the Authorities Having Jurisdiction and as required to allow proper design review to verify compliance with the above referenced standards and the project documents. These items shall be supplied to the Engineer and OWNER in a timely fashion to allow design review prior to construction, fabrication or installation, but in no case less than 3 months prior to beginning of fabrication or installation.
- C. The OWNER reserves the right to approve or reject, at the design documentation submittals listed below, all design aspects of the carrier materials, design and aesthetics. Submittals will be reviewed for compliance with the contract requirements.
1. STRUCTURAL DRAWINGS – 90 DAYS AFTER NTP
 - a. Within 60 days after Notice To Proceed (NTP), the SYSTEM SUPPLIER shall provide all structural loadings that are imposed on the anchorages and stations. Within 90 days after NTP from the OWNER, the SYSTEM SUPPLIER shall provide final design drawings of station rope support and anchorage components to the Engineer and OWNER for review. Also within 90 days of NTP, the SYSTEM SUPPLIER shall supply a detailed rope profile for both the track ropes and hauling ropes confirming the location of supports and anchorages as shown on the drawings supplied by the OWNER.
 2. MECHANICAL DRAWINGS – 150 DAYS AFTER NTP
 - a. Within 150 days after NTP from the OWNER, the SYSTEM SUPPLIER shall provide final design specifications and drawings of the mechanical equipment to the Engineer and OWNER for review prior to fabrication.
 3. ELECTRICAL DRAWINGS – 150 DAYS AFTER NTP
 - a. Within 150 days after NTP from the OWNER, the SYSTEM SUPPLIER shall provide final design specifications and drawings of the electrical equipment and control system to the Engineer and OWNER for review prior to construction/fabrication. This shall include, but not be limited to, shop drawings, schematic drawings, panel layouts, detail diagrams, product cut sheets on all manufactured subsystems and recommended electric service entrance sizing for each station.
 4. WELDER QUALIFICATION CERTIFICATES
 - a. Prior to manufacturing of any welded structural components, the SYSTEM SUPPLIER shall provide copies of certification of qualifications to the Engineer for all welders working on the project. If additional welders are added to the team subsequent to the start of construction, certificates of qualification shall be forwarded to the Engineer prior to the welder beginning work.
 5. PRIOR TO ACCEPTANCE TESTING
 - a. The SYSTEM SUPPLIER shall supply all as-built record documents and manuals noted in this Section at least 7 days prior to Acceptance Testing:
 - b. The SYSTEM SUPPLIER shall supply OEM equipment catalog cuts for all equipment; all required maintenance manuals with maintenance procedures for all equipment and an operational manual. The quantities to be supplied are as follows:

1.) OEM Catalog Cuts	3
2.) Maintenance Manual	3
3.) Operational Manual	3
 - c. The SYSTEM SUPPLIER shall supply copies of all testing certificates and results accumulated during the Quality Control program. As a minimum, the certificates shall include carrier non-destructive testing, haul rope and track rope breaking strength testing, and mill certification of metals and shafting.
 - e. In addition the SYSTEM SUPPLIER shall supply an electronic version of the record documents in a format to be agreed upon by OWNER and SYSTEM SUPPLIER.
 6. Hazardous Materials Notification
 - a. In the event no product or material is available that does not contain asbestos, PCB or other hazardous materials as determined by the OWNER, a "Material Safety Data Sheet" (MSDS) equivalent to OSHA Form 20 shall be submitted for that proposed product or material prior to installation.

7. Asbestos and PCB Certification

- a. After completion of installation, but prior to Substantial Completion, Contractor shall certify in writing that products and materials installed, and processes used, do not contain asbestos or polychlorinated biphenyls (PCB), using format in Division 1 Section "Closeout Procedures"

1.7 QUALITY CONTROL AND QUALITY ASSURANCE

- A. The work of this section shall be performed by a company which specializes in the type of Aerial Tramway work required for this Project, with a minimum of 5 years of documented successful experience and shall be performed by skilled workmen thoroughly experienced in the necessary crafts.
- B. Manufacturer shall specialize in manufacturing the type of Aerial Tramway specified in this section, with a minimum of 5 years of documented successful experience, and have the facilities capable of meeting all requirements of Contract Documents as a single-source responsibility and warranty.
- C. The SYSTEM SUPPLIER shall have a quality control program to verify that materials and methods conform to this specification.
- D. SYSTEM SUPPLIER shall propose testing and procedures to the OWNER/Engineer, based on the final design.
- E. As a minimum the SYSTEM SUPPLIER shall non-destructively test the carrier according to procedures recommended by the manufacturer for continuing maintenance and operation; SYSTEM SUPPLIER shall test all wire ropes according to the requirements of ANSI B77.1-2011; SYSTEM SUPPLIER shall supply mill certifications and procurement test reports on all axles, terminal sheave axles, and structural tubing; and SYSTEM SUPPLIER shall furnish supplier certifications for structural steel.
- F. The SYSTEM SUPPLIER shall conduct Design Verification Tests on all component equipment of new or modified design and on all component equipment of previous design whose application in the system specified herein involves previously unverified design characteristics. These tests shall be conducted before full production, fabrication and manufacturing begins and in accordance with the SYSTEM SUPPLIER's prepared and OWNER approved test procedures. The test results shall be made available for OWNER review within 2 weeks of the completion of those tests. The object of Design Verification Tests shall be to verify that the equipment functions in the environment in which it is intended to operate, in accordance with specified design requirements and that it achieves the desired interface with associated equipment. The SYSTEM SUPPLIER shall provide the OWNER with a list of systems, subsystems, or components that require Design Verification Tests for review and approval.
- G. All subsystems and system elements including component equipment thereof shall pass functional product tests in accordance with the SYSTEM SUPPLIER's engineering and quality assurance test specifications, industry standard tests and special tests specified herein prior to installation into the next level of assembly and prior to shipment. The SYSTEM SUPPLIER shall impose these same test requirements on Sub-SYSTEM SUPPLIER's, Suppliers and vendors utilized in the performance of the work.
- H. The SYSTEM SUPPLIER shall maintain a quality control program to assure that the requirements of AWS D1.1/D1.1M-2010, Chapter 2 and Chapter 4 are met. Only prequalified joints as listed may be used without approval of the Engineer. The design of all welding used on power transmission components and cyclically stressed structural members shall consider the effects of cyclic stressing due to load changes and conform to limits as prescribed in the referenced codes.
- I. The electrical work shall be performed in accordance with NECA Standard of Installation. The SYSTEM SUPPLIER shall provide documentation of systems compliance with UL or other independent testing agencies.
- J. Copies of the results of all testing and certifications shall be supplied to the Engineer and OWNER within two weeks of the testing or certification.

1.8 DELIVERY, HANDLING, STORAGE

- A. Comply with General Conditions and Division 1 Section "Product Requirements".

1.9 COORDINATION

- A. The SYSTEM SUPPLIER shall designate a Project Manager for the Project. The Project Manager shall be responsible coordinating all submittal information and processing requests for information from the Engineer and OWNER.
- B. The SYSTEM SUPPLIER shall attend coordination meetings with Transbay Joint Powers Authority (TJPA) for purposes of coordination with the Transbay Transit Center design. The SYSTEM SUPPLIER shall assume no fewer than 6 such meetings with TJPA. All design, shop drawings and fabrication will be required to reflect such coordination.

1.10 ACCEPTANCE TESTING

- A. The SYSTEM SUPPLIER shall formulate the Acceptance Testing procedure and submit the procedure to the OWNER/Engineer for review and comment 30 days prior to Acceptance Testing. The SYSTEM SUPPLIER shall be responsible for conducting the testing program. The testing program will be observed by the OWNER/Engineer.
- B. Prior to initiation of the Acceptance Testing, the ropeway system shall be substantially complete and shall operate continuously for 24 hours.
- C. For the acceptance testing of the ropeway system, the SYSTEM SUPPLIER shall supply sufficient technical personnel, equipment and labor for adjusting of all mechanical and electrical equipment that may be required.
- D. The CONTRACTOR shall supply and handle the load test ballast. Upon Acceptance of the system, the ballast shall become the property of the OWNER. The load test ballast is anticipated to be at least 4675 lb (25 pax x 170 lb x 110%).
- E. All control system; subsystem; system; and device functionality and adjustment shall be verified to the satisfaction of the OWNER, Engineer and the Authorities Having Jurisdiction during the Acceptance Testing.

1.11 OPERATION AND MAINTENANCE SUPPORT

- A. The SYSTEM SUPPLIER shall furnish operation and maintenance manuals for all equipment 30 days prior to the beginning of the acceptance-testing period. Final additions for brake adjustments and acceptance testing data shall be added to the manuals at the conclusion of the testing.
- B. The SYSTEM SUPPLIER shall supply one electronics technician and one mechanical technician on the site of the work for a period of 30 operational days after the acceptance of the SYSTEM SUPPLIER's work by the OWNER. Subsequent to this period, the SYSTEM SUPPLIER shall supply one technician for an additional 30 days. The cost of these technicians shall be included in the contract price. The SYSTEM SUPPLIER may supply one technician, if, in the reasonable opinion of the OWNER, the technician is skilled and has experience in both electronic and mechanical systems for the ropeway system.
- C. The SYSTEM SUPPLIER shall train the OWNER's personnel by allowing them to assist in the mechanical and electrical fabrication and installation. The cost of these OWNER personnel shall be borne by the OWNER.

1.12 SPARE PARTS

- A. The SYSTEM SUPPLIER shall furnish all spare parts required for continual operation during the first twelve months after acceptance by the OWNER. The cost of any replacement parts during this period shall be borne by the SYSTEM SUPPLIER. The SYSTEM SUPPLIER, during this initial twelve month period, shall consign to the OWNER the anticipated requirements for spares to be stored at the project site which shall not exceed \$100,000.

1.13 WARRANTIES

- A. Comply with General Conditions and Division 1 Section "Product Requirements" in addition to those listed below.
- B. In accordance with the warranty clause contained in the Agreement between the OWNER and the SYSTEM SUPPLIER, the SYSTEM SUPPLIER shall provide warranties according to the following schedule. The warranties shall include all parts and labor.

1. Primary Drive (Motors and Controllers)	2 years
2. Evacuation Drive	2 years
3. Gearboxes	2 years
4. Couplings and Drive Trains	2 years
5. Bullwheel and Deflection Sheave Liners	2 years
6. Cabin, Hanger and Carriage	2 years
7. Painting	2 years
8. Electrical Parts, Controls and Drive	2 years

1.14 CONTRACT CLOSEOUT

- A. A project walk through shall be conducted at least 3 days prior to the Acceptance Testing for the purpose of generating a punch list of items that shall be required for completion of the SYSTEM SUPPLIER's work. Those present for this walk through shall be a representative of the OWNER, SYSTEM SUPPLIER and Engineer.
- B. In addition, items that become evident during the acceptance testing or those required by the Authority Having Jurisdiction shall be included in the punch list.
- C. Upon completion of the punch list items by the SYSTEM SUPPLIER and receipt of an operating certificate from the Authority Having Jurisdiction, the OWNER shall accept the work of the SYSTEM SUPPLIER as being complete with the exception of the warranties described herein.

1.15 SUBSTITUTIONS

- A. Comply with General Conditions and Division 1 Section "Product Requirements" using form in Division 1 Section "Substitution Request Form".
- B. Components specified herein or shown on the approved drawings either identified by manufacturer, size or rating shall not be substituted without the written approval of the OWNER and a written modification to the Agreement.
- C. The term "or approved equal" used in this specification shall mean prior written approval from the OWNER or an approved shop drawing by the Engineer.
- D. A detailed list of substitution items shall be submitted with the Bid.

1.16 LIST OF DRAWINGS

- A. The following preliminary drawings are supplied and become a part of the contract documents. The SYSTEM SUPPLIER shall prepare their own drawings as defined in the specifications for use in constructing the system.
1. TRANSBAY TOWER PARK-PLAZA GONDOLA PLAN AND PROFILE
 2. LOWER STATION GENERAL ARRANGEMENT
 3. UPPER STATION GENERAL ARRANGEMENT
 4. LOWER STATION STRUCTURAL AND CONNECTION DETAILS
 5. UPPER STATION STRUCTURAL AND CONNECTION DETAILS
 6. DRIVE MACHINERY ARRANGEMENT
 7. CABIN DEVELOPMENT VIEWS
 8. **TRANSBAY TOWER PROJECT DRAWINGS**

1.17 DESIGN CRITERIA

- A. For the design of the new ropeway system the following design parameters shall be used in conjunction with the referenced standards. Capacity calculations shall be submitted with the Bid.
1. Temperature: 20° F to 120° F
 2. Wind in Operation at Maximum Design Speed of System: 50 mph
 3. Wind Maximum Peak Operating Speed: 65 mph
 4. Wind not in Operation: 85 mph

5. Importance Factor: 1.15
6. Occupancy Category: III
7. Wind Exposure: Category B
8. Seismic Design Category: D
9. Maximum Design Speed: 1.25 m/s¹
11. Operating Speed: 1 m/s
12. Cabin Design Capacity: 25 passengers
13. Floor Area: 65 ft²
14. Target Design Capacity: 350 pphpd²
15. Passenger Design Weight: 170 pounds
16. Annual Available Operating Hours: 7,200
17. Annual Ropeway Trips – One Way: 230,000

1.18 DESIGN LIFE

- A. The Ropeway System design life is intended to be compatible with the environment in which it is intended to operate. The ropeway system shall be designed for an operating life of at least 30 years using current standards with appropriate maintenance as defined by the SYSTEM SUPPLIER in the System Operating and Maintenance Plan. Where appropriate, calculations shall support this design life.

END OF SECTION

¹ Meter per second

² Passengers per hour per direction