

# **APPENDIX X – CONSTRUCTION QUALITY PROGRAM**



# **CONSTRUCTION QUALITY PROGRAM**

City of Las Vegas Department of Public Works  
City Engineer Division  
Quality Assurance

Version 2.0  
January 2, 2018

City of Las Vegas Department of Public Works, Nevada  
Construction Quality Program

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# City of Las Vegas Department of Public Works, Nevada Construction Quality Program

## 1 PURPOSE

- A. The manual only addresses the construction quality assurance. It does not contain the Construction Management Policies and Procedures.
- B. The City of Las Vegas Public Works, City Engineer Division has developed this manual for Performing Quality Construction to establish and document the Quality Assurance.
- C. This manual is the permanent reference detailing the program and defining policies, elements, activities, and guidelines to assure that the materials and workmanship in all construction projects conform reliably to the requirements for the approved plans and specifications.
- D. It has been developed in part using the criteria contained in Federal Regulation 23 CFR 637B-Quality Assurance Procedures for Construction as a guideline and other documents associated with Departments of Transportation.
- E. The Quality Control (QC) and Quality Assurance (QA) personnel must adhere to this manual's procedures and intent.
- F. When applying City of Las Vegas Public Works policy to the Quality Assurance of construction contracts, the proper application of engineering experience and judgment is extremely important.
- G. Before attempting to apply these instructions and guidelines, the City Project Representative must have a thorough understanding of all Contract Documents, including the plans, special provisions, Uniform Standard Specifications, and other contract requirements.

### 1.01 Key Quality System Components

- A. The Quality System is broken down into the following key components or categories:
  - 1. Quality Control (QC) by the contractor:
    - a. Qualified Laboratories and Testing Personnel: The Contract Documents, and specifically the Special Provisions, requires that all Quality Control testing personnel on the Contract possess NAQTC or WAQTC and ACI Certification (as required) and that all Quality Control testing on the Contract are AASHTO R18 AMRL/CCRL accredited including companies and/or contractor ASTM D 3666 (Asphalt Concrete and Aggregates), D 3740, C1077. The testing method accreditation is required for both field and laboratory testing.
    - b. The contractor must perform the QC in accordance with the contract documents, primarily sections 105 and 111 through 117. These specifications include testing and inspection with required documentation.
- B. Quality Assurance (QA) by the Engineer
  - 1. The Engineer performs oversight of the Contractor Quality Control by using QA inspectors and testers. The testing is performed at a lower frequency than the contractor for verification of the QC process testing.
    - a. Qualified Laboratories and Testing Personnel: The Consultant contract requires that all Quality Assurance testing personnel on the Contract possess NAQTC, WAQTC, and/or ACI Certification and that all Quality

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Assurance testing companies and or contractors on the Contract are AASHTO R18, AMRL/CCRL accredited including ASTM D 3666 (Asphalt Concrete and Aggregates), D 3740, C1077. The testing method accreditation is required for both field and laboratory testing.

- b. City of Las Vegas Public Works further implements the Statement of Qualifications process for pre-qualification of Service Providers for Construction Contract Administration and Quality Assurance Inspection and Testing. This process assures personnel and laboratories working as Quality Assurance on the Contracts meet the same requirements.

C. Material Source Program

1. City of Las Vegas Public Works maintains this category of the Quality System to monitor material sources.
2. At the Contract Administration level, this category is important in determining the extent of Quality Control and Assurance involvement at the source of the materials. There are two (2) levels a material supplier may obtain:
  - a. Qualified Source: This assures the quality of the material through acceptance sampling, testing, and inspection performed by Quality Assurance or designated Representatives. This is performed annually and the source posted on the Interagency Quality Assurance Committee (IQAC) website for qualified sources. The QC testing on the project and at the source does not change; these source names are used in order to obtain materials without the use of a long submittal process. Testing and inspection is required by the contractor.
  - b. Authorized Source: This level assures the quality of the material through inspection and verification of the qualified Material Source Quality Control Plan and its application and/or inspection of the source facility. For Federally funded projects, these sources will be considered as qualified, not authorized. Testing and inspection at the facility by the contractor will be required.

**2 FEDERALLY FUNDED CITY OF LAS VEGAS PROJECT REQUIREMENT OVERVIEW**

The City of Las Vegas program utilizes City procedures dovetailed into the Federal NS 23 CFR 637B Requirements which allows for one manual.

**2.01 Policy (23 CFR 637.205)**

- A. The City Engineer provides the appropriate oversight to ensure that the City's quality assurance program is being implemented as approved. At a minimum the oversight shall cover:
  1. Materials sampling and testing issues,
  2. Construction inspection issues covering the specific attributes which reflect the quality of the finished product, and

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3. City capabilities – maintaining an adequate qualified staff to administer the Quality Assurance program and qualified laboratories.

**2.02 Quality Assurance Program (23 CFR 637.207)**

- A. The City's acceptance program provides a level of inspection to adequately assess the specific attributes which reflect the quality of the finished product. Acceptance inspection includes inspection of the component materials at the time of placement or installation, as well as the workmanship and quality of the finished product.
- B. Samples used in the acceptance decision are acquired as close as possible to where the material is incorporated into the project.
- C. The City QA controls the verification sampling locations and timing until immediately prior to sampling.
- D. When using non-authorized sources, the rate of testing is higher. This may be due material of questionable quality and wider ranges of test results, including failing tests.
  1. QC Testing Frequencies are noted in the Special Provisions. No reduction in tests will be permitted.
  2. QA testing frequencies are a minimum 10% for non-structural items and 30% for specialized and structural items. Section 10.02 details items required to have QA testing increased to 30% of QC.
- E. When contractor's tests are used in the acceptance decision and the City and contractor test results are not within tolerance range, the frequency of verification testing shall be increased until the issue is resolved.
- F. After the sampling is complete, the City will obtain the contractor's test data as soon as it is available, however no later than the time indicated on the testing turn-around as noted in the contract documents. The City's test results will not be given to the contractor until after the contractor results are received.
- G. The City reviews the contractor's source documentation as part of the City's quality assurance program.
- H. Test results are not to be discarded unless it is known that the sampling or testing was flawed. It may be appropriate to perform additional testing when the quality of the material is in question.
- I. Project materials are to be used in the Quality Assurance (QA) program, samples shall be split between QA and QC by the QC within close proximity to the same location as the samples used in the acceptance decision.
- J. In general, the basis of acceptance is the QC data as verified and validated by QA. Therefore, QA tests a minimum 10% of the required QC testing. The QA testing is increased to 30% of QC for specialized and structural items. Section 10.02 details items required to have QA increased to 30% of QC
  1. The verification is accepted after statistical validation of the data, in accordance with ASTM D4460 and C670.

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2. The City uses visual inspection and/or the manufacturer's certification as a basis for accepting small quantities of non-critical material only if the material cannot be field tested.

**2.03 Laboratory and Sampling and Testing Personnel Qualification (23 CFR 637.209)**

- A. All test procedures used in the acceptance decision shall be in the scope of accreditation for the consultant laboratory.
  1. All laboratories that are utilized on the project must be R-18 AASHTO accredited and meet the requirements of ASTM D3666, D3740, and C1077.
  2. All testing personnel must be NAQTC, WAQTC, and/or ACI certified in the test methods for which they are performing.

**2.04 References**

- A. The manual uses the Uniform Standard Specifications (“Blue Book”) and special provisions as the basis for contract administration instructions and guidelines.

The manual contains many references to other publications and documents, including other City of Las Vegas Public Works manuals and publications. However, CLVPW has made a concerted effort to minimize any repetition of information found in other publications.

**2.05 Revisions to this Manual**

- A. New or revised specifications may affect the current manual guidelines for contract administration. As specifications, practices, procedures, and policies change, subsequent revisions will be made to this manual and summarized in table form.

**2.06 Definitions**

<b><i>Term</i></b>	<b><i>Definition</i></b>
<b>Authorized Materials List</b>	A list generated by the Owner, Engineer, Contracting Agency, Agency or their designated representative which contains materials that are Authorized for incorporation into the work with prior written submittal of product name and manufacture only. The period of Authorization is indefinite, contingent upon continued execution of the Quality Control Plan with the Engineer's review.
<b>Acceptance Testing (AT)</b>	Sampling and testing, to determine the degree of compliance with contract requirements.
<b>Acceptance Inspection (AI)</b>	Inspection to determine the compliance with the contract requirements
<b>Bid Number</b>	The bid number is the unique identifier, generated by the Finance/Purchasing Department, used to file all documents during the construction phase.

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<b>Term</b>	<b>Definition</b>
<b>Consultant</b>	An engineering firm hired to perform Construction Management/Administrative services for City of Las Vegas
<b>Contract</b>	The agreement between the Contractor and City of Las Vegas. All facets of the agreement under which the Contractor is performing.
<b>Critical Activities</b>	A series of work activities on the Project, which according to the Schedule are the controlling or critical factor for completion of the Project. These activities are put in order of precedence to demonstrate their direct impact on other portions of the work. Only one item of work may be considered the Critical Activity at any point in time.  Synonyms are Critical Item, Controlling Item
<b>Critical Path Method</b>	A method of Project Scheduling used on all City of Las Vegas Public Works Projects to document the sequence work activities used by the Contractor specifically linked together showing interdependence.
<b>Control Measures</b>	All actions taken to assure that materials are in compliance with specifications, including, but not limited to submittal, testing, inspection, documentation, quantifying for testing and payment, As-Built drawings, material tracking, etc. The Contractor, Owner, and/or Owners' representative will perform independent Control Measures to assure that all elements of the project are within specifications.
<b>Control Procedures</b>	All Control Measures shall be detailed in Control Procedures within the Quality Control Manual of the Contractor. Two types of Control Procedures are required in the Manual; Administrative Procedures and Activity Specific Procedures.
<b>Hold Point</b>	A stage of Construction which requires QA inspector to verify Contractor's workmanship.
<b>Inspection</b>	A control measure utilizing visual and manual methods to determine the quality of workmanship, material, or finished products. Inspections shall determine if all verifiable parts, practices, and products are in compliance with the Contract Documents. All inspections shall be documented, and any deviations from Contract Documents shall be noted therein.

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<b>Term</b>	<b>Definition</b>
<b>Lot</b>	<p>One day's production, regardless of quantity produced. One day's production shall be considered as one continuous production run within one working day by the Source or Contractor from which the finished product was produced.</p> <p>Examples of a Lot are as follows: one "heat" or one continuous pouring from a caldron for reinforcing steel, one day's production of a particular mix design of Asphalt Cement Concrete regardless of tonnage quantity, one "batch" of Portland Cement, one day's production of a particular mix design of Portland Cement Concrete, etc.</p> <p>Lots by the above definition may be divided into separate lots upon request from the Contractor and with the approval of the Engineer. Lots may be composed of several sub-lots as provided by specification.</p>
<b>Material</b>	A material is a raw or composite of several raw substances used in the Work, or Products.
<b>Non-Contracted Construction</b>	Work, which will be dedicated to the City upon successful completion, however, the City, is not the first party of the contract for the construction of the work.
<b>Oversight</b>	All daily inspection, supervisory oversight, and normal worker performance verification checks performed by the Contractor's supervisory personnel during production of the work. Oversight shall be documented as part of a functional Quality Control Plan.
<b>Pre-Activity Meeting</b>	A meeting to coordinate the quality control, quality assurance, work planning, scheduling, and other details for a specific activity prior to its start. This formal meeting shall resolve all outstanding issues regarding submittals, testing requirements, elevation controls, work plans, etc.
<b>Project</b>	In this manual, Project shall be considered to be identical in meaning with the Contract. It shall reference the specific job-site of the Contract.
<b>Project Number</b>	This Number is issued for all construction projects by the City Engineer Division of City of Las Vegas Public Works for internal cost accounting. Many Project Numbers have more than one Contract to complete. For the purposes of this manual, reference is made only to the specific Contract project and the relevant Project Number for that project.
<b>Owners Representative</b>	Any of the following individuals: City Engineer, Program Manager, Construction Manager, Construction Management Supervisor, Project Manager, Construction Project Representative, and Consultant Project Manager.

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<b><i>Term</i></b>	<b><i>Definition</i></b>
<b>Construction Management Supervisor</b>	<p>When the words Project Manager stand alone within this manual it shall mean City of Las Vegas’s Construction Management Supervisor position.</p> <p>Other “Project Managers” are referenced in this manual, and shall be specifically referred to as:</p> <p style="padding-left: 40px;">Consultant Project Manager, Contractor Project Manager, or Engineering Project Manager</p>
<b>Qualified Materials List</b>	<p>A list generated by the Engineer, or their designated representative, which contains materials, requiring an abbreviated submittal prior to incorporation into the work. The period of Qualification will typically be one year.</p>
<b>Quality</b>	<p>Quality is obtained if the stated requirements are adequate, and if the completed project conforms to the requirements. Quality in the constructed project is obtained by conscientious application of a thoroughly planned Quality Control System implemented through quality-control procedures.</p>
<b>Quality Assurance (QA)</b>	<p>A sampling and testing program that will provide assurance that the materials and workmanship incorporated into the construction project are in conformance with the contract specifications. The main elements of a QA plan are the AT, and IA.</p> <p>The governing agency responsible for assuring contractor contract testing/inspecting compliance.</p> <p>All Control measures taken by the Owner, Engineer, Contracting Agency, or their designated representative to verify that Quality Control measures, materials, workmanship, etc. comply with Contract Documents and the related Quality Control Plan(s).</p>
<b>Quality Control</b>	<p>A) Quality Control is the planned and systematic actions necessary to provide adequate confidence that the construction of the project complies with the Contract Documents.</p> <p>B) Qualified contractor designee responsible for informing Quality Assurance and scheduling/verifying contract inspectors.</p> <p>C) Quality Control shall be all measures taken by the Contractor and/or the Source to assure that materials, workmanship, etc. are in compliance with specification.</p>

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<b><i>Term</i></b>	<b><i>Definition</i></b>
<b>Responsible Person in Charge (RPC)</b>	The primary Representative of the Contractor, generally the Superintendent. This individual has specific duties required by the contract.
<b>Source Inspection</b>	AT of manufactured and prefabricated materials at locations other than the job site generally at the manufactured location.
<b>Testable Quantity</b>	The amount of work, material, construction quantified by the units used for determination of testing frequency. Testing units and payment units may be different, for the purposes of this document. All Quantities shall be Testable Quantities.

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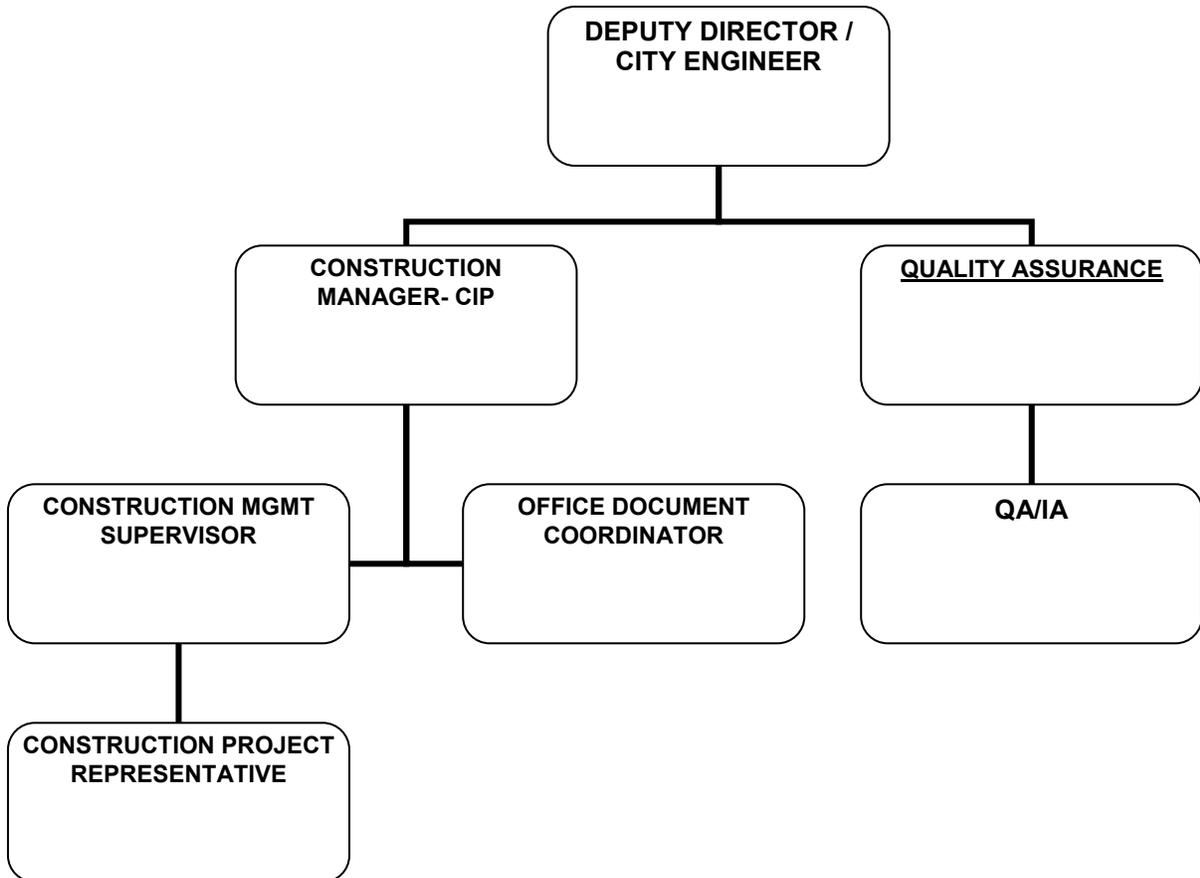
**Table of Acronyms**

<b><i>Acronym</i></b>	<b><i>Description</i></b>
<b>AAP</b>	AASHTO Accreditation Program
<b>AASHTO</b>	American Association of State Highway and Transportation Officials
<b>ACI</b>	American Concrete Institute
<b>ACIA</b>	American Construction Inspectors Association
<b>AMRL</b>	AASHTO Materials Reference Laboratory
<b>ASTM</b>	American Society for Testing and Materials
<b>CCRL</b>	Cement and Concrete Reference Laboratory
<b>IQAC</b>	Inter-Agency Quality Assurance Committee
<b>MUTCD</b>	Manual on Uniform Traffic Control Devices
<b>NAQTC</b>	Nevada Alliance for Quality Transportation Construction
<b>NDOT</b>	Nevada Department of Transportation
<b>OSHA</b>	Occupational Safety and Health Administration
<b>RTC</b>	Regional Transportation Commission of Southern Nevada
<b>RFCD</b>	City of Las Vegas Regional Flood Control District
<b>USACE</b>	United States Army Corp of Engineers
<b>WAQTC</b>	Western Alliance for Quality Transportation Construction

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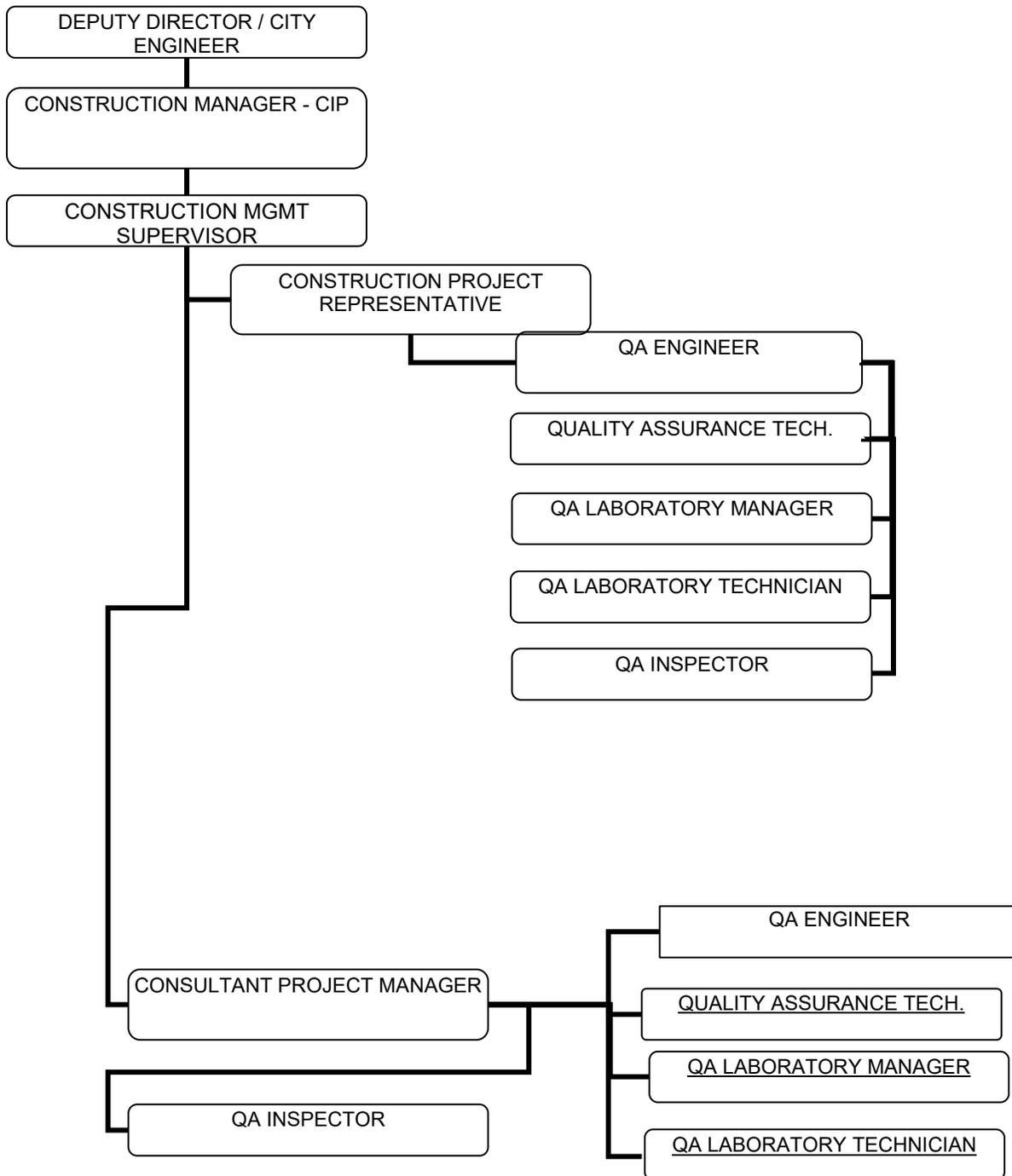
**3 ORGANIZATION**

**3.01 Internal Organization Chart**



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3.02 Contract Level Organization – Onsite Inspection



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## **4 RESPONSIBILITIES**

### **4.01 General**

- A. The Capital Project Management (CPM) Section of the City Engineer Division is responsible for the quality assurance of construction contracts assigned to the Department of Public Works which ensures compliance of the contractor Quality Control (QC).
- B. The CPM Section provides for the quality construction through contract administration, and uniformity in construction project materials testing and inspection. Responsibilities include, but not limited to, the following:
  - 1. Managing QA construction inspection and QA testing
  - 2. Reviewing project documentation for completeness and accuracy
  - 3. Providing technical support regarding construction methods and techniques
  - 4. Training field personnel (informal on-the-job and formal)
  - 5. Developing construction specifications
  - 6. Participating in construction-related research
  - 7. Oversight of the field tester qualification program
  - 8. Develop field test methods and revise, as necessary
  - 9. Coordination of the Interagency Quality Assurance Committee

### **4.02 Quality Assurance Responsibilities**

- A. Inspect, sample and test soils, aggregates, asphaltic concretes, Portland cement concretes, and other materials in accordance with the Contract Documents. Provide the results of such sampling and testing and inspection reports to the Construction Management Supervisor.
- B. Attend progress meetings, job conferences, and other meetings related to Project material testing when requested.
- C. Acquire samples for laboratory testing and receive samples which are furnished at the Project site by Contractor and witnessed by the owner or the owner's representative.
- D. Review Contractor's Quality Control daily testing results and inspection reports to ensure they are complete, timely and within the scope of the Contract specifications.
- E. Report to the Construction Management Supervisor if it is believed that any work is unsatisfactory, faulty, defective or does not conform with the Contract Documents, or does not meet the requirements of any material inspections. This includes tests or approvals required, and advising the Construction Management Supervisor when they believe any of the work should be corrected or rejected or shall be uncovered for inspection, or requires special testing.
- F. Keeps a daily diary or log book recording the quality assurance field testing and inspection on the project site and specific observations.

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- G. The QA testing companies and/or contractor shall be an AASHTO R18, AMRL/CCRL accredited including ASTM D 3666 (Asphalt Concrete and Aggregates), D 3740, C1077. The accreditation is required for both field and laboratory testing.
- H. Receive, review, and analyze samples, catalogue data, laboratory tests of materials and other data which the Contractor submits as a joint sample in accordance with the Contract Documents. Maintain a QA log of lab testing submittals, and test results.
- I. Prepare and provide a monthly Quality Assurance report that reflects an analysis of all material tests performed and the QA/QC for ratio of required tests. The monthly Quality Assurance report shall be stamped by a Nevada Licensed Professional Engineer.
- J. All testing technicians/inspectors performing Quality Assurance testing shall be NAQTC/WAQTC/ACI certified for the tests they perform.

**4.03 Position Descriptions**

- A. Specific functions performed by each individual are contained throughout this manual and are not defined in the brief descriptions below.
- B. This portion of the manual is not intended to define all of the functions performed by a position.
- C. Each individual shall be responsible for reading this manual and understanding all of the details of their assigned functions.
- D. City Engineer / Deputy Director of Public Works (DPW)
  - 1. The City Engineer leads the program to deliver quality infrastructure products and services. The City Engineer does the following:
    - a. Establishes the Division's and Section's direction, definition, policies, and objectives.
    - b. Develops and uses performance measures to determine program efficiency and effectiveness.
    - c. Construction Manager – CIP and Construction Management Supervisor Coordination with other Divisions, Departments, and Agencies
    - d. Must be a Nevada P.E.
- E. Construction Manager – CIP (CMCIP)
  - 1. The Construction Manager - CIP, under the general direction of the City Engineer, is the primary supervisor for construction and administration of all City of Las Vegas Public Works contracts. The Construction Manager must also be a Nevada P.E.
  - 2. On complex or sensitive construction issues, Construction Manager – CIP shall report to and consult with the City Engineer.
- F. Construction Management Supervisor (CMS) / Engineering Project Manager / Project Engineer.

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1. The Construction Management Supervisor primary responsibility is to administer assigned construction Contracts on a day-to-day basis and reports to the Construction Manager - CIP.
  2. The Construction Management Supervisor must thoroughly study the assigned Contracts, becoming familiar with all its facets.
  3. These duties include, but are not limited to:
    - a. Analyzing the plans, estimate, and preliminary quantity calculations, and determine if the estimated quantities cover all work items contemplated.
    - b. Oversight and supervision of Quality Assurance Consultants on Contracts
    - c. Oversight and supervision of Consultant staff on Contracts
    - d. Identify major discrepancies and taking appropriate action
  4. Once assigned, the CMS will remain assigned to the Contract until its completion, including the completion of all Contract documents and administrative matters.
- G. Construction Project Representative (CPR) performs dual roles within the organization as defined below:
1. In this capacity, the Construction Project Representative will be required to perform all functions of the Construction Management Supervisor (under-fill) in their absence.
  2. This is a generic title used throughout this manual to label each of the three distinctions of Inspector, Construction Management inspection, Augmentation inspector, and Consultant Inspectors.
  3. Generally, the CPR is the “first line of defense” after the Contractor QC within our organization.
  4. The CPR also acts as the primary liaison between the Contractor, the public, and City of Las Vegas.
  5. The CPR’s are authorized to inspect and/or test all work performed and materials furnished for the assigned Contract(s).
  6. Such inspections may extend to all or any part of the work and to the preparation, fabrication, or manufacture of the materials to be used. The CPR must thoroughly study the assigned Contracts and becoming familiar with all its facets.
  7. The CPR’s are not authorized to alter or waive provisions of the Contract or to issue instructions contrary to the Contract.
  8. The augmentation inspector is used as a label for CPR who is an employee of a Consultant contracted to provide an individual to perform the CPR function.
  9. Augmentation Inspectors are utilized as an extension of City of Las Vegas staff and answer directly to the City of Las Vegas’s assigned CPR or CMS on a day-to-day basis.
- H. Consultant Project Manager

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1. The Consultant Project Manager is an employee of a Consultant firm contracted to perform Contract Administration functions on a specific Contract. This position is the lead for the Consultant team and becomes the Primary Contact for the Contract.
2. The Consultant Project Manager will be assigned many of the tasks typically associated with the Construction Management Supervisor and Construction Project Representative.
3. The instances when the Consultant Project Manager acts with this authority are specifically identified within this manual.

Normally, a peer-to-peer relationship exists between the CMS and the Consultant Project Manager. However, in the absence of the Construction Management Supervisor, the Consultant Project Manager shall regard the CPR as the Project Manager and shall contact them with Contract issues.

#### **4.04 Contract Inspection and Testing**

- A. This category of the Quality System assures the workmanship of materials incorporated into the City of Las Vegas Public Works Contract through inspection and testing.
- B. Quality Control (QC): All of the functions of the Contractor to assure, test, and document that the work is in compliance with the Contract Documents and the Quality Control for the Contractor called out therein.
  1. Ultimately, the Contractor has responsibility for the quality of all materials and workmanship on any Contract, including but not limited to all aspects of testing, inspection, and submittals.
  2. The contractor and material source must conform to the Quality Control Program version format indicated in the contract documents.
  3. QA and QC verification testing shall not use split samples, however shall be tested at the same approximate location and time.
- C. Quality Assurance (QA): The Construction Management Section or their representative performs Quality Assurance in the form of oversight, testing and inspection to verify the effectiveness and accuracy of the Contractors Quality Control. Additionally, the Quality Assurance performs analysis on Quality Control data and assesses compliance with the materials and workmanship. This is performed using validation forms from the verification testing.
- D. The key elements of Quality Assurance by the City are qualified testers, timeliness and documentation.
- E. The Quality Assurance shall verify that all items have been submitted, tested, inspected, accepted, and that each step listed was conducted in the appropriate time frame to control work as it progresses.
- F. The Quality Assurance shall verify tracking the usage of all materials on the Contract. Retention of all Quality Assurance Documentation shall be as required until completion of the Contract, at which time the documentation shall be prepared for imaging by City of Las Vegas. For FHWA projects, all records must be submitted in the original form, no duplicates are permitted.

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- G. The Contractor Quality Control and Owner Quality Assurance testing personnel on the Contract possess NAQTC, WAQTC, and/or ACI Certification and that all testing companies and/or contractor are AASHTO R18, AMRL/CCRL accredited including ASTM D 3666 (Asphalt Concrete and Aggregates), D 3740, C1077. The accreditation is required for both field and laboratory testing.
- H. Quality Assurance Testing Engineer (Professional Engineer)
1. The Quality Assurance Testing Engineer works for an AASHTO R18, AMRL/CCRL accredited laboratory including ASTM D 3666 (Asphalt Concrete and Aggregates), D 3740, and C 1077. The accreditation is required for both field and laboratory testing. This laboratory shall be contracted by City of Las Vegas or its consultant to perform Quality Assurance Testing.
  2. As the Professional Engineer registered in Nevada over the Quality Assurance Testing Technician and the Quality Assurance Laboratory Technician, the Quality Assurance Testing Engineer is **in** responsible charge of this work.
  3. The Quality Assurance Testing Engineer oversees the proper conduct and reporting of all testing performed for Quality Assurance on the Contract.
  4. Advise the Construction Manager – CIP or designee of any violation subject to the following for testing and/or inspection:
    - a. NAC 625.550 Licensee employed by governmental agency: Notification to Board of certain conduct by another licensee. ([NRS 625.140](#)) Any person licensed pursuant to this chapter who is employed by any governmental entity shall notify the Board in writing when:
      - 1) Another licensee has submitted substantially incomplete plans (*test data as well*) to the governmental entity;
      - 2) The governmental entity has, on three or more occasions, rejected plans (*test data*) submitted by another licensee for the same project; or
      - 3) Another licensee has failed to respond in a timely manner to correspondence from the governmental entity.
- I. Quality Assurance Testing Technician (QATT)
1. The Quality Assurance Testing Technician performs field and laboratory testing of materials incorporated into the work.
  2. The Quality Assurance Testing Technician is required to be NAQTC, WAQTC, and/or ACI certified in the area in which they are performing testing.

## 5 CONSTRUCTION MANAGEMENT SELECTION

- A. On or about the time of Advertisement, a Construction Management Supervisor (CMS) is designated and a determination made as to whether or not a Consultant will be retained to administer the contract.
- B. The Construction Manager - CIP (CM-CIP) will evaluate manpower and work loading to make this determination.

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- C. CLVPW may retain engineering consultants to administer construction projects. When a consultant performs the duties of a CMS or CPR, the responsibilities are identical, except a consultant cannot do the following:
  - 1. Obligate funds
  - 2. Authorize payment on behalf of CLVPW
- D. Should it be determined that a consultant is needed to help manage a Federally funded project, one of the following will occur:
  - 1. For consultant fees estimated to be \$25,000 or greater, consultant selection will be made using a Request for Statement of Qualifications (RSOQ) process following all applicable Federal guidelines if Federal funding is to be used to pay for the consultant fees. This process will be performed by the Purchasing & Contracts Division of the Finance Department and the Construction Management Section of the Public Works Department.

## **6 CONTRACT RECORD SETUP**

### **6.01 Contract Records (Hard Copy Files)**

- A. The Construction Management Section is the custodian of records for all Contracts after award of bid to the end of the project warranty period.
- B. The CPR is responsible for maintaining a complete file of all Contract documents during the active life of each Contract.
- C. These files shall be maintained in the Construction Management office until the contract close-out has been completed.

## **7 SUBMITTALS**

- A. The contract documents instruct the contractor for the proper submission and contents of a material submittal for review.
- B. The Contractor Responsible Person in Charge (RPC) shall attest that the content of the submitted materials has been reviewed against the Contract Documents, and that the materials are in compliance.
- C. The contract will include the submission of resumes and qualifications of the Contractor's personnel to ensure those individuals meet or exceed the requirements of the positions they will hold for the Contract special provisions section 113. Failure to meet minimum requirements for a position will be grounds for rejection of that individual in the position assigned.

Submitted materials that are to be evaluated as "Or Equal" or "Substitution" shall be reviewed for accuracy and sufficiency of back-up documents so that the CPR Design Project Manager can determine whether the material qualifies as an "Or Equal" or "Substitution."

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**7.01 Materials**

- A. There are three (3) basic categories of material sources that may be utilized. Defined below are the general description of the category and the minimum Submittal content. Determine which category the Contractor is submitting and use the appropriate details.
- B. The Contractor shall clearly state on the Submittal if the Material(s) is currently listed on the Authorized Source List or the Qualified Products List.
  - 1. Authorized Source List Materials
    - a. An Authorized Source list cannot be used on federally funded projects. They will not be considered to be authorized thus the contractor must include the source testing as a part of their contract.
  - 2. Qualified Products List Materials
    - a. This category of Material comes from a Source which has demonstrated to the Inter-Agency Quality Assurance Committee that the Material meets the minimum "Blue Book" specifications.
    - b. The Inter-Agency Quality Assurance Committee (IQAC) is responsible to periodically review the Material for continued compliance.
    - c. Ensure that the Special Provisions for the Contract do not place additional requirements on the material prior to approval for Contract use.
    - d. The Submittal shall include copies of the most recent test data approved by the Inter-Agency Quality Assurance Committee.
    - e. These materials DO NOT receive special treatment in regard to Quality Assurance and Quality Control, Onsite and Plant testing frequencies. They must be tested in accordance with the Quality Control Frequency Table in the contract documents.
  - 3. Certified Materials
    - a. In general, a Certificate of Compliance will be acceptable as a Submittal for the given material provided that the materials and that the certification is current and include test for the lot. The certification must include the tests for the lot.
    - b. Following is a partial list of construction materials that may be accepted based on Certificates of Compliance. This list is not all-inclusive and is subject to change:
      - 1) Traffic Control Items
      - 2) Sign Materials
      - 3) Striping
      - 4) Guideposts/Object Markers
      - 5) Signal and Lighting
      - 6) Irrigation Systems

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- 7) Landscaping
- 8) Water Line Systems
- 9) Pipes and Drains
- 10) Engineering Fabrics
- 11) Polymer Concrete
- 12) Precast Concrete
- 13) Cattleguards
- 14) Guardrail
- 15) Barrier Systems
- 16) Structural Steel
- 17) Paint, Stain and Graffiti Coating
- 18) Miscellaneous Metals
- 19) Fencing

C. Qualified Products List (QPL)

- 1. When the City of Las Vegas uses the NDOT QPL it shall be listed in the contract special provisions. The City's Construction Project Representative will be responsible for collection and verification of material certifications prior to installation.

**8 QUALITY SYSTEM INSPECTION AND TESTING INTERACTION**

- A. All efforts by City of Las Vegas, Consultant, and Augmentation personnel shall be considered Quality Assurance (QA).
- B. Quality Assurance ensures that the Contractor Quality Control (QC) performs their duties diligently, documents their efforts, and produces a quality product for the public.
- C. All efforts by the Contractor's personnel to execute the Contract are to be considered QC. However, the Contractor is only required to document those efforts specifically named in the Contract Documents.
- D. It is the responsibility of the Owners Representative, as Quality Assurance to oversee Quality Control performance, documentation, and effectiveness. This includes in-progress inspection and testing and the final inspection request from the Contractor.
- E. The Contractor QC may be used for acceptance only if the QA verifies the QC testing, in accordance with ASTM D4460 and C670.

**8.01 Quality Control Relations**

- A. The Owners Representatives and the Contractor's personnel shall make every effort to work together to expedite the prosecution of the Contract.
- B. The work is to be done without violating the terms and conditions of the contract or sacrificing the quality of work or materials.

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- C. No instructions for means and methods shall be given to the Contractor. Limit Instructions to the scope of the plans and specifications, such as interpretations of plans and specification requirements. However, it is appropriate to advise of a flaw that may cause a delay or extra work by the contractor.
- D. Resolve misunderstandings with the Contractor's employees promptly. It is the Contractor's responsibility to provide the Agency with a quality product.
- E. It is up to the Quality Control personnel to give instruction to the Contractor's personnel and provide acceptable solutions when there is a question about the quality of materials, method of construction, or workmanship on the Contract.
- F. Quality Assurance does not abdicate the acceptance responsibility; Contractor Quality Control is an extension, a first layer, to ensure a quality project by placing the first line of quality at the contractor level.
- G. The QA inspector has full stop work authority of the contractor if they, as determined by the contract, repeatedly fail to comply with the contract specifications.
- H. If at all possible, the contractor shall not be allowed to proceed "at their own risk" as that, by definition, is not quality control. If the material is placed at risk, the contractor shall be notified that no payment will be made for the material.
- I. Differences of opinion may occur between the Contractor's employees and those of the Owners Representative about the contract, interpretation of the specifications, quality of work, and measurement and payment of items.

The Owners Representative will try to resolve any of the above issues promptly and fairly within the scope of the Contract documents. If disagreements cannot be satisfactorily resolved, the Owners Representative will refer the matter to an immediate supervisor.

**8.02 Contractor's Quality Control**

- A. The Contractor is required by specification to implement Quality Control as stated in contract Special Provision Sections 105, and 111 through 117. The contractor testing must conform to the frequency as required in the contract documents.
- B. Familiarity with these specifications for the Contractor's Quality Control is fundamental to performing Quality Assurance testing.
- C. During the course of construction the Quality Assurance tester is to perform routine oversight and document the work operations and Quality Control functions.
- D. It shall be considered appropriate and normal for the Quality Assurance Inspector to "point out" potential issues that may or may not jeopardize the quality of the work, issues that may affect the productivity of the work, or any other related issues that affect the execution of the Contract.
- E. The Quality Assurance Inspector shall interact directly with the responsible person-in-charge, Quality Control Inspector and Foreman in this regard.
- F. If the Contractor does not correct an issue prior to Quality Assurance acceptance, the Quality Assurance Inspector shall document the issue as a Deficiency on the appropriate Activity Card or issue a Non-Compliance Report for those issues not covered by an Activity Card. The CMS shall be immediately notified.

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- G. The contractor Quality Control may be used for acceptance only if the Quality Assurance verifies through validation the Quality Control testing in accordance with ASTM D4460 and C670.

**8.03 QA Inspector Responsibilities**

- A. Inspectors have two important responsibilities. The first and primary responsibility is to confirm that the contractor's work and site activities conform to the plans and specifications. The second responsibility is to document the contractor's work.
- B. Under the supervision of the Construction Manager or designee, inspectors are authorized to inspect all work performed and materials furnished. Inspections may extend to all or any part of the work and to the preparation, fabrication, or manufacture of the work materials. Inspectors are not authorized to direct contractor operations. However, an inspector communicates with the contractor and other project personnel to reduce misunderstandings relating to the interpretation of the plans and specifications.
- C. Inspection overview of duties includes but is not limited to:
  - 1. Observing, inspecting and documenting the contractor's workmanship, materials, and methods for conformance with the plans and specifications
  - 2. Interpreting the plans and specifications
  - 3. Documenting inspection and testing operations in the daily construction report
  - 4. Measuring work and materials for payment
  - 5. Observing construction operations for compliance with safety regulations, traffic control requirements, and construction-related government regulations
- D. The Inspector interacts with the contractor on a continual basis. There are two main activities that aid in the project construction process; pre-activity meetings and the use of activity cards.

**8.04 Pre-Activity Meetings**

- A. A pre-activity meeting is conducted by the contractor in order to get all persons that are involved in a construction activity to communicate the actions that will occur. This aids in the coordination of the inspection, testing, equipment allocation, and other pertinent activities.
- B. The Contractor is required, but not limited, to conduct Pre-Activity Meetings for each of the following scenarios:
  - 1. The first time a crew (Contractor and/or Subcontractor) begins work on any item
  - 2. When the Contractor elects to change Quality Control Coordinators
  - 3. When the Contractor elects to change Foreman
  - 4. When the crew has not conducted this activity for a significant period of time
- C. Planning Pre-Activity Meetings
  - 1. The Contractor Quality Control Manager is responsible for planning each Pre-Activity Meeting. They must coordinate with the Quality Assurance Inspector to

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assure that all items being inspected and tested by Quality Control have been addressed.

2. The Quality Control Manager will need to address any work operation which may impact the progress and quality of the work.
3. Examples of work operations which may adversely affect quality could be any of the following:
  - a. No plan for a back-up generator
  - b. The only generator on the job-site malfunctions, concrete has been placed and no vibrators are working, thus the quality of the placement is in jeopardy.
  - c. Back-up concrete mix design
  - d. The day of placement the batch plant is down, the Contractor scrambles to find a supplier, and the only available mix has not received Submittal approval, thus the quality of the placement is in jeopardy.
4. The examples above are typical of when planning could help avoid potentially detrimental effects to the quality of the work.
5. The Quality Control Manager, with the coordination of the Quality Assurance Inspector, shall foresee as many such instances as possible and greatly reduce the chances of poor quality work.
6. The Quality Control Manager shall generate a Pre-Activity Agenda in written form.

D. Pre-Activity Meeting Attendees

1. Generally, the Pre-Activity Meeting shall be open to any interested party or as required by the contract. Review the contract for required attendees.
2. Conducting Pre-Activity Meetings
  - a. The Quality Control Manager is responsible for assuring that the Pre-Activity Meeting is conducted.
  - b. The meeting itself must be conducted in advance of work being performed. For routine items, the meeting may be conducted immediately prior to work commencing.
  - c. During the Pre-Activity Meeting, Quality Control shall address all items affecting the quality of the work.
  - d. The Owners Representative will be allowed to contribute during the meeting, adding additional discussion points that may be necessary.
3. Pre-Activity Meeting Minutes
  - a. The Quality Control Manager is responsible for generating minutes to each Pre-Activity Meeting.

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The Owners Representative shall have the responsibility to review the Meeting Minutes and comment as necessary. At a minimum, distribution shall be all those in attendance and to file.

**8.05 Activity (QC) Cards**

1. The Contractor is required to document all Control Measures taken by their Quality Control staff. The Activity Card has been developed to simplify and standardize this documentation. The most current card form is in the contract documents. Refer to Exhibit “D” for sample of “Advance Notification Card” and Exhibit “E” for sample of “Activity Card.”
2. To ensure that Quality Control has properly documented their efforts, noted all deficient work, and agreed to Quality Control quantities, Quality Assurance Inspectors must use the activity cards that are initiated by the Contractor, .
3. The following Section by Section descriptions of Activity Card interaction are based on the Activity Card Form found in the contract documents. This card originates from the contractor.
  - a. Top of Form
    - 1) The top of the Form has Contract Information including Project Name, Contract Day, and Report Number. The Contractor is required to complete this information.
  - b. **Section 1 – Actual Work Performed**
    - 1) The contractor will list the work that was performed that requires inspection.
    - 2) When Quality Control fails to identify deficiencies, but has performed and documented a successful inspection in the work, the following steps shall be taken.
      - a) Document the deficient work on the Activity Card.
      - a) Document Quality Control’s failure to identify the deficient work.
    - 3) A note is made in Section 2 - Deficient Items, Cleared or New on the Activity Card, as well. Clearly describe Quality Controls failure to perform.
    - 4) If the failure will take more than a brief description to define, write “See remarks” here and complete your comments in Section 5 - Remarks.
    - 5) The Quality Control Inspector is required to track this Deficiency through the balance of the system, log and resolution.
    - 6) A Deficiency needs be noted whenever it is not corrected on the same day. Even if the Contractor plans to work the Deficient area the following day, circumstances may change the plan and the work may not be completed until some future date.
    - 7) Small items of Deficiency may be resolved by the Contractor after the formal Inspection.

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- 8) A small item can be reviewed upon correction. A remark, indicating that a minor item was found and corrected, will suffice without having to record and track a Deficiency. This action is solely at the discretion of the Quality Assurance Inspector due to the myriad of circumstances that could be in effect.

c. **Section 2 - Deficiency Check**

1. The Quality Control Manager will perform a routine check of outstanding Deficiencies to verify if any exist for the Activity covered by this card.
2. If a Deficiency is outstanding, a remark as to the Type of Deficiency Description would be included.
3. If no Deficiencies are outstanding, the Quality Control Representative would have initialed and dated that portion of this Section.
4. The Quality Control Inspector is required to verify that any outstanding Deficiencies are addressed.

d. **Section 3 - Inspection Items**

1. Several Inspections related issues are addressed in the Section and are broken down into the two (2) categories as follows:
  - a) Onsite Inspections
    - 1) Upon completion of the work, the Quality Control Inspector shall perform inspection(s) of the relevant portion of the work. Checklist inspection forms are to be used by the Contractor.
    - 2) Generally, individual line items shall be indicated for each area of work by the contractor that requires inspection signoff. e.g. forms, reinforcement, placement. Specifically when Hold Points demand review of the work at a specific point in time.
    - 3) A hold point is a point where the construction must stop to await inspection by Quality Assurance.
    - 4) Hold points may be given as an attachment in the Special Provisions and discussed in the pre-construction meeting. The Contractor may elect to lump some items together for a single inspection point, e.g. forms and reinforcement inspection concurrently. Discussions about Inspection points, Hold Points, and line items for inspection shall have been discussed at the Pre-Activity Meeting.
    - 5) If disputes arise, the Quality Control Manager shall conduct another Pre-Activity Meeting for resolution.
    - 6) For work that does not have an example, the contractor must develop their own for approval by the Engineer.

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- 7) When an inspection is completed and the work found to be acceptable, the Quality Control Inspector will initial and date the appropriate line item and forward to the Quality Assurance Inspector for concurrence.
- 8) The Quality Assurance Inspector shall initial and date Section 3 adjacent to the inspection item for the work being reviewed.

b) Offsite Inspection

- 1) Offsite or Batch Plant Inspection shall also be recorded in this section of the Activity Card by the contractor. If the Contractor is required to perform the Inspection, they must ensure that documentation is tracked.
- 2) Generally, this line item is a prompt for the Quality Control Manager to log the Offsite Inspection and track the documentation from the appropriate Quality Control Inspector.

e. **Section 4 - Testing and Sampling Items**

1. The Contractor is required to test specific materials onsite and offsite. Which materials to be tested are defined in Table 1 located in the approved construction documents.
2. The Quality Assurance Inspector shall review the testing results individually to ensure "pass/fail" criteria have been met. The Quality Control Technician is required to report test results to the Quality Assurance Inspector prior to leaving the Contract site for each testing event.
3. Typically this reporting will be conducted in person. There are two categories of testing:
  - a. Onsite Testing
    - 1) Documentation of onsite testing is accomplished through the Activity Card Section 4 - Testing Requirements and attachment of test results.
    - 2) Each item being tested will have one (1) line item in Section 4. The Testable Quantity associated with the testing, as addressed above, will also be documented here.
    - 3) The Quality Assurance Inspector is required to verify that Quality Control Representatives have completed this Section of the Activity Card.
    - 4) Generally, documentation of testing is performed by the Quality Control Technician. However, the Quality Control Inspector or Manager may take responsibility for this item.

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b. Offsite Testing

- 1) When sampling is performed in conjunction with an Offsite Inspection, Quality Control must document the samples in Section 4 - Testing Requirements of the Activity Card.
  - 2) This line item is a tracking mechanism to assure that the samples taken during Offsite Inspections are logged, tracked and filed in accordance with the Quality Control.
  - 3) The Quality Assurance Inspector shall review Contract Quality Control Files on a weekly basis to assure that all Offsite Testing is being tracked properly.
  - 4) Particular attention must be paid to Offsite Testing by the Quality Control and Quality Assurance Representatives.
  - 5) The Inspection report generated at the Offsite Inspection will need to be reviewed closely to assure that sampling was or was not conducted.
4. Whenever materials are sampled onsite for QC, QA Laboratory Testing, a line item shall be added by Quality Control to this Section. The purpose of the sample line item is to log and track these samples until the testing results are returned from the laboratory.
  5. The Quality Assurance Inspector shall review Contract Quality Control Files on a weekly basis to assure that all samples are being tracked properly.
  6. In addition to having the individual tests recorded, it is essential that Testable Quantities be documented. Traditionally, construction materials were quantified for payment only.
  7. The Contractor shall be required to measure and the QA is required to verify, and then reach an agreement on Testable Quantities daily.
  8. The Contractor is required to document Testable Quantities on the Activity Card. The calculations should be attached to the Activity Card.
  9. Independent measurement or witnessing the measurements and calculations may be used for verification. Additionally, both the Planned and Actual number of tests taken shall be completed in Section 4 - Testing Requirements.
  10. The Actual number of tests to be performed is the sum of the Testable Quantity divided by the Testing Frequency (See Table 1).

f. **Section 5 - Remarks**

1. Use as applicable to document remarks or notes related to the Activities performed on this Card.

g. **Section 6 – Q.A. Sign Off**

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1. The Quality Assurance Inspector is required to initial and date this Section of the Activity Card once the Contractor has completed the event.
2. Quality Assurance "sign off" is limited as it does not represent acceptance of the work performed, but is a verification that Quality Control Testing/ Inspection was performed, Testable Quantities are representative of the work.
3. Should the Quality Assurance Inspector be in disagreement with the statement for a given day, they may add any comments necessary in Section 7 - Remarks to explain.
4. The Contractor would be required to record, track and address the comments as a Deficiency.

**8.06 Activity Advance Notification**

- A. The Contract Documents require that there be advanced notification to Quality Assurance. The Advance Notification allows the Owners Representative time to schedule all necessary Quality Assurance inspection and testing.
- B. The Quality Assurance Inspector shall initial directly on the Card that the notification was received. When Short Notice was given, include the date and time notification was presented.

**8.07 Unexpected Activity Notification**

- A. Circumstances sometimes dictate that work be performed with less than twenty-four (24) hours Advance Notice. It is City of Las Vegas's position to allow such activities when possible.
- B. The primary factor limiting such an allowance would be the availability of Quality Assurance Inspectors or Technicians.
- C. When Inspection and/or testing cannot be accommodated within the short time frame, the activity would not be allowed.
- D. Quality Control personnel are required to note Unexpected Activity activities on the Advance Notification Card. Quality Assurance personnel are required to ensure that it has been noted, or note it themselves.
- E. It is the intent, in allowing short notice, to accommodate those unforeseen circumstances that can happen on the job. It is NOT the intent to allow the Contractor to habitually violate the twenty-four (24) hour requirement.
- F. Should the Contractor habitually give short notice, contact the Project Manager to resolve the issue.

**8.08 CONTRACTOR LOG INTERACTION**

- A. The Contractor Quality Control Manager will review and log individual items as they occur.
- B. The Quality Assurance Inspector is required to ensure weekly that logging is conducted properly.

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- C. The Contractor Quality Control Manager is required to keep and maintain each Log with the current status of each item on the Log.
- D. The individual items on the Log shall be numbered sequentially and clearly identify the content.
- E. Copies of the individual items shall be kept in the file system in the same sequential order as the Log Number indicates for ease in retrieval. These logging and filing rules apply to each of the Logs listed below:
  - 1. Submittal Log
  - 2. Pre-Activity Meeting Log
  - 3. Activity Card Log
  - 4. Material Tracking Log
  - 5. Deficiency Log
  - 6. Sample Log

## **9 INSPECTION RECORDS**

### **9.01 General**

- A. All QA Inspectors, including Augmentation and Consultant staff, shall complete a “Daily Inspection Report” for each day the employee works on a Contract.
- B. One Inspection Report shall be generated for each Contract inspected during that day.
- C. Construction Project Representatives (CPR) shall complete a Daily Inspection Report when performing inspection duties on a Contract or to document any delays, weather events, etc.
- D. Records shall be given to the CMS not less than weekly. Project Managers may require more frequent submissions.
- E. The CMS has the responsibility to review the reports from each inspector. The CMS shall ensure the reports are complete, accurate and submitted on time.

### **9.02 Daily Inspection Report**

- A. “Daily Inspection Reports” are to be factual in nature; personal feelings and/or opinions shall not be included.
- B. The following information shall be included, when appropriate, in each “Daily Inspection Report” an example of which is in Exhibit “A”. These items do not cover each and every possible condition; however, they are intended to provide each Quality Assurance Inspector with guidance to capture adequate information to prepare concise and accurate daily reports.
  - 1. Contract Header
    - a. Contract Name (as described in the contract documents)
    - b. Bid Number and Contract Number
    - c. Contractor

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- d. Superintendent
- e. Contract hours (not inspector hours)
- 2. Contract Information
  - a. Day and Date (i.e. Friday, December 28, 2004)
  - b. Report Number (sequential)
  - c. Contract Day number
  - d. Temperature (minimum and maximum in Fahrenheit)
  - e. Weather remarks (rain, wind, snow, etc.)
- 3. Subcontractors
  - a. List each subcontractor
  - b. Onsite or not
  - c. Hours worked
- 4. Visitors -
  - a. List each visitor to the site, utility representatives, citizens you may have had discussions with, contractor management personnel not normally onsite, etc.
  - b. Hours onsite
- 5. Traffic Accidents, Utility Breaks, Contract Delay
  - a. Check boxes that apply
  - b. For any "YES" box has been checked, insert comments in Section G explaining the "YES."
- 6. Traffic Control Status
  - a. Note any changes in traffic control set-ups, special maintenance performed, correction notices issued and time corrected.
- 7. Work being performed
  - a. Activities –
    - 1) Who performed the activity, prime contractor crew or subcontractor?
    - 2) Where the activity occurred.
    - 3) What work is being performed?
    - 4) When did it occur, giving the duration and any relevant specific times?
    - 5) Quality Assurance and/or Quality Control functions on this activity.
  - b. Schedule –
    - 1) Scheduled work not being performed.

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- 2) Work available, but not scheduled, which could have been performed.
- 3) Activities started but not progressing.
- 4) Delays caused by City of Las Vegas, utilities, or by third parties.
- c. Measurements
- d. Pay Quantities
- 8. Quality Assurance Inspector or Tester presence –
- 9. List any time off site, annual leave, meeting time, office time
- 10. Utility Issues –
  - a. Relocation work ongoing, by whom, for what, any specifics.
- 11. Conversations –
  - a. List any conversations with persons relevant to the Contract, including property owners, supervisors, contractors, utility, or Engineer.
- 12. Quality Assurance Inspectors Name
  - a. Printed name

**9.03 Manpower and Equipment Report**

- A. Whenever multiple QA inspectors are working on the same Contract and completing this form for different portions of the work, it is necessary to coordinate to eliminate duplication of information and information being missed.
- B. The assigned CMS must ensure that the daily reports are completed and formatted properly so that a comprehensive list of Manpower and Equipment can be generated which accurately represents the Contractor's and Subcontractor's, efforts.
- C. When applicable, the Consultant Project Manager shall be responsible for assuring completion of this form and coordination between Quality Assurance Inspectors on Contracts administered by Consultant.
- D. The general Contract information shall be completed on the first working day of the week.
- E. Each day the QA inspector will complete that day's information.
- F. The QA inspector will not wait until the end of the week to compile the entire form. The CMS is responsible to verify timeliness of form completion.

**9.04 Non-Compliance Report (NCR)**

- A. General
  - 1. An NCR is any documented item that has demonstrated to not be in conformance to the contract specifications. It is a deficiency and must be indicated on the deficiency log.
  - 2. Non-Compliance Reports may be generated by any Engineers Representative on the Non-Compliance Report Form.

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B. Generating Non-Compliance Report

1. Once an Initial Issue arises that the Contractor is unwilling or unable to correct immediately, the Engineers Representative shall generate a Non-Compliance Report.
2. The Non-Compliance Report shall include:
  - a. Contract information, Name, Number, Bid Number
  - b. Relevant specifications
  - c. Full description of the initial issue
  - d. Actions taken to verbally notify the Contractor
3. The Contractor must sign each Non-Compliance Report form to acknowledge receipt, even if the Contractor does not agree with its content.
4. If a Contractor refuses to sign the form, this refusal shall be noted on the form. The form shall then be immediately sent by certified mail to the home office address of the Contractor.
5. Non-Compliance Reports will require a formal written response by the contractor. With respect to materials, the contractor's response must be reviewed and approved by a Nevada P.E.

C. Non-Compliance Report Tracking

1. On-site Logging
  - a. The Owners Representative who generated the Non-Compliance Report shall be responsible for ensuring that the Contractor has logged it into the Quality Control Deficiency Log.
2. A remark shall be made on the relevant Activity Card stating that a Non-Compliance Report was issued.

**9.05 Contractor Deficiencies**

- A. Deficiency is the generic term used to define all deficient work related issues raised on the Contract.
- B. Most deficiencies are minor in nature and can be remedied in the field.
- C. Regardless of the "importance" of the issue, all deficient work is tracked through the Contractor's Deficiency Log.
- D. Any Quality Assurance Construction Representative or Quality Control Construction Representative may initiate a deficiency.
- E. Quality Control must record and track deficiencies through the Activity Card and Deficiency Log processes. Quality Assurance may utilize the same processes or may issue a Non-Compliance Report to document deficient items.
- F. Failed test results shall be indicated on the deficiency log.
- G. Recording Deficiencies

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1. The QC Inspector has two ways in which to record a deficiency, through the Non-Compliance Report or through the Activity Card.
2. When the Activity Card process is used, take the following steps:
  - a. Verbally notify the responsible Quality Control Inspector for the item of work that a deficiency item has been found.
  - b. Determine if the deficiency is correctable prior to subsequent work being affected.
  - c. Allow the Contractor as much time as possible to correct the deficient work.
  - d. Once it becomes apparent that the work will not be completed by the end of the day, locate the Activity Card for the item and record the deficiency thereon.
3. Deficiency Log
  - a. Regardless of by whom or how a deficiency was originally documented, Quality Control is required to track it and the Deficiency Log is the location to record the tracking process.
  - b. The QA inspector is responsible for ensuring that Quality Control records all deficiencies in the log. A minimum of weekly review of the Activity Cards and the Deficiency Log must be recorded in the QA Inspector's Daily Inspection Report.

H. Deficiency Response

1. The Contractor is required to respond to each deficiency issued. This response must be in a written form.
2. The Contents of the response shall include:
  - a. Clearly identified the steps being taken or to be taken to rectify the initial issue
  - b. A time frame for achieving full compliance
3. In some instances, the Contractor may submit a response which asks to allow the work to remain in place. In these instances the Project Manager, with the guidance of the Construction Management Supervisor, will be the authority for what is allowed to remain. A written recommendation from a Contractor Professional Engineer, licensed in the State of Nevada for the relevant type of work must accompany any response for work to remain in place.

I. Clearing a Deficiency

1. Letter of acceptance
  - a. When the particular deficiency is not minor in nature, a deficiency response would be generated
  - b. The Project Manager will use the standard City of Las Vegas Public Works letter format to generate the response.

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2. Recording on the deficiency log
  - a. The QA Inspector is required to ensure that
  - b. QC notes the response on the Deficiency Log.

## **10 QUALITY ASSURANCE OF QUALITY CONTROL TESTING**

### **10.01 General**

- A. Under the supervision of the CPR, QA Testers are authorized to inspect or test materials incorporated or to be incorporated into the work.
- B. Testers may test materials fabricated at commercial material sites or fabrication facilities.
- C. Because test results are the deciding factor in accepting or rejecting work or material, accurate test results are important.
- D. The QA Tester must maintain testing equipment in good condition. When testing equipment requires repair, replacement, or calibration, the Tester must inform the laboratory manager.
- E. Testing procedures must conform to the specified test methods, and documentation must be complete and accurate.
- F. For federally funded projects and non-authorized sources. The QA Inspector shall also review the material source documentation for compliance to the contract specifications which includes the testing frequency in accordance to Table 1.
- G. Test material shall not be discarded until after final acceptance unless it is known that it was flawed.

### **10.02 Verification in the Field**

- A. In general, verification of QC Test Results shall occur at the contract site and laboratory independently on a minimum one QA test to every ten QC tests, with a minimum of one per day for each type of accumulative material. The exception is for higher risk items. The frequency for QA on the following items is 30% of QC:
  1. All material for Roadway Arterials equal to and greater than 80 feet in width
  2. Concrete for bridge structures
  3. Channel, drop inlet or culvert concrete vertical walls greater than five feet in height and length greater than 15 feet
  4. Backfill materials within five feet of, and under general concrete structures
- B. A splitter shall not be used for the QA and QC samples. They are to be sampled separately by QA and QC at the same time and approximate location. This protocol is designed to test for the material, not the tester.
- C. The timing and location of the testing shall be controlled by QA until just prior to testing. The test results are given the same day verbally to the QA Inspector as to the disposition of the results with a hard copy attached to the activity card (field tests only).
- D. If the QC test passes, the work may continue. If it fails, more testing by the contractor will be required after re-working the area.

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- E. If the QA test fails and the QC test passes, both must re-test in the same area that failed. If failure occurs from both, the area is to be re-worked and re-tested. If a pass by QC and a fail by QA or visa-versa continues for that area, the QA testing shall be increased until consistency exists.

**10.03 Dispute Resolution**

- A. If verification cannot be obtained, an immediate review of the results shall be requested by the Project Manager.
- B. The Project Manager shall investigate the test data and forward requests, which warrant further investigation to the QA Supervisor.
- C. If a dispute remains or the circumstances continue, the Project Manager may require more testing or use a third party to determine the problem. Third party testing may be proposed under the following conditions:
  - a. The third party shall be a separate laboratory, meeting the minimum qualifications set forth for materials testers and laboratories on the project and not performing any additional work for the Engineer, Contractor, Subcontractors, and/or Suppliers on or for the project.
  - b. The third party shall be agreed to by both the Contractor and the Engineer.
  - c. Costs for the third party testing shall be as follows:
    - i. Initial test for the disputed work shall be paid for by the Contractor.
    - ii. For each instance of conflict if the third party's test results reflect Engineer results, Contractor shall pay for any additional testing performed by the third party after the initial test.
    - iii. For each instance of conflict if the third party's test results reflect the Contractor results, the Engineer shall pay for any additional testing performed by the third party after the initial test.

**11 ACCEPTANCE OF WORK**

- A. Acceptance of materials will be based on whether or not the Project Manager was able to verify the Contractor Quality Control based on both testing and inspection.
- B. If the QA is not able to verify the QC test data, both parties are required to attempt to reach a consensus for acceptance criteria within the Contract specifications which may require more testing. When consensus cannot be achieved by both parties, third party resolutions will be required pursuant to 10.03 Dispute Resolution.

**12 QUALITY ASSURANCE TESTING REPORTS**

- A. The contract special provision Section 112 states that the Contractor shall be responsible for coordinating the monthly quality control summaries at the end of each calendar month and submitting to the QA within 5 working days after each calendar month. However, the timing may be altered by the Engineer for convenience of the Engineer or Contractor. The summary must be reviewed for compliance.
- B. The report layout must be approved by the City prior to the initial submittal.

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- C. The monthly report shall include a summary of the QA testing performed during the contractor reporting period that includes the frequency of testing as required in this manual and the backup documentation for all tests performed.
- D. The ratio of QA to QC testing must be incorporated in the QA monthly report.
- E. The CPR or CMS shall review the summary and check for short falls in testing, sampling, or quantities and have been identified, quantified, and acknowledged.
- F. QA deficient items shall be acknowledged and documented in the QA deficiency log. Resolution actions to be taken shall be clearly stated in the log. A material resolution shall be reviewed and stamped by the Nevada P.E. who has responsible charge.
- G. A Professional Engineer shall certify that all field and laboratory testing was performed correctly, and that the corresponding data is accurate.
- H. The certification shall be attached to the monthly submittal.
- I. Additional P.E. stamped letters shall accompany the monthly summary to indicate a P.E. level review and acceptance of the information provided by outside laboratories.
- J. The QA report may be submitted on media as follows:
  - 1. CD-Rom
  - 2. Spectraquest test report printouts
  - 3. Other word processor documents
  - 4. Or any combination
- K. The summary shall be submitted in the following format:
  - 1. Cover letter generated by the QA Team.
  - 2. P.E. stamped cover letter stating review and approval of the test summary.
  - 3. Field Test Result Summary that shall indicate all field test procedures and results performed during the reporting period. Items and tests shall be summarized by type.
  - 4. Field Density Test Result Summary indicating all pertinent information generated during all field density testing.
  - 5. Laboratory Test Result Summary that shall indicate all laboratory test procedures and results performed during the reporting period. Items and tests shall be summarized by type.
  - 6. Laboratory Concrete Break Result Summary facilitating brief analysis of critical concrete strength data. Items shall be summarized by cylinder set numbers.
  - 7. Laboratory Aggregate and Soils Result Summary indicating all gradation test procedures performed during the reporting period.
  - 8. Testable Quantity Summary that shall indicate total month and to-date counts of tests performed relative to the testable quantities and to-date testable quantities.
- L. The monthly QA summary report shall attach a copy of the most current AASHTO R-18 and AASHTO tests accreditation status for the laboratories referenced in the report from

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the AASHTO web site. The accreditation shall include the tests used on the project and attach the printout of the AASHTO web page. Additionally, the QA summary report shall include documentation of compliance with ASTM D3666, D3740, and C1077.

M. The report shall also attach a list of the certified technicians that were working at the referenced laboratories or in the field for the project during that report period.

N. All validation reports shall be included.

**12.01 Final Reporting**

A. A final QA summary report shall be generated in accordance with Section 12 and shall not be submitted until such time as all discrepancies and non-conformances have been resolved.

B. At the timing as specified in the contract, or at a minimum monthly, all original Contractor, Consultant and Engineer testing and inspection documents must be transferred, consolidated and stored by the Engineer for a minimum of 5 years. They shall include all field inspection/testing and laboratory typed and hand written forms, letters, notes, and results. Storing of copies is prohibited.

**Appendices**

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Appendix	Title
A	DAILY REPORT
B	PRE-ACTIVITY MEETING AGENDA
C	ADVANCE NOTIFICATION CARD
D	ACTIVITY CARD
E	QUALITY CONTROL (QC) AUDIT FORM
F	QUALITY ASSURANCE (QA) AUDIT FORM

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Appendices

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# City of Las Vegas-Const Management

## DAILY REPORT

333 N. Rancho Dr.  
Las Vegas, NV 89106

Phone: (702)229-5373 Fax: (702)382-3901

No. 008

**COMPANY:** Las Vegas Paving **DATE:** 3/9/2016  
**REPORT PERIOD:** Daily **DAY:** Wednesday  
**PROJECT:** Las Vegas Bike Lanes **JOB:** CM-003(179)  
**TEMPERATURE:** 60 - 70 **PRECIPITATION:** None **SKY:** Clear **WIND:** 10-20

### ACTIVITY

Day 10 of 150 calendar days.  
Issues:

200.01 - Mobilization and Demobilization - LV Paving has mobilized equipment to the Elkhorn Rd. Location.

613.01- Concrete "L" Type Curb & Gutter - LV Paving has placed forms and poured concrete for the curb & gutter at:  
1 - Elkhorn Rd .& Unicorn NE Corner - 42 LF.  
QC inspection have been performed by LVP.

613.02 - Concrete Sidewalk- LV paving has installed forms and poured concrete at the following locations along Elkhorn Road (ER). Testing for concrete has been taken by LV P and Nova. QC inspection have been performed by LVP.  
1 - E R & Decatur Blvd, SE Corner - (37 x 6.5), 241 SF.  
2 - E R. and Unicorn, NEC -(42 x5.5 ), 220 Sf.  
3 - ER & Leon, NWC and NEC - (26 x 5) + ( 13 x 5), 195 SF.  
Total sidewalk poured 656 SF.

613.03 - Detectable Warning Panels - LV Paving has installed 11 panels at the locations described above for sidewalk pours.

624.01 - Traffic Control and Maintenance - LV Paving has installed a Traffic Control setup on Elkhorn Rd. from Decatur Blvd - Jones Blvd.

### EQUIPMENT

Hours	Source	Units	Type	Work Area	Description
8 Hrs.	LV PAVE	1	WORK/PU TRUCK	ER	Ford F550
Hoe Ram mounted on a Skid Steer / New Holland .	LV PAVE	1	HOE RAM	ER	New Holland
	LV PAVE	1	WORK/PU TRUCK	ER	Chevy 3500
	LV PAVE	1	WORK/PU TRUCK	ER	Ford F350
	LV PAVE	1	FRONT LOADER	ER	Kawasaki 60ZW
	LV PAVE	1	VACTOR TRUCK	ER	PeterBuilt/HV56
Traffic Control Maintenance	LV PAVE	1	WORK/PU TRUCK	ER	Isuzu NPR HD

### FIELD FORCE LABOR

Category	Source	Supv.	Frmn.	Jrny.	Appr.	Work Area	Remarks
Concrete Crew	LV PAVE	1	1	8	1	ER	1-Apprentice Flagger 1- laborer 2 - Masons
Geo-Tech Tester	LV PAVE			1		ER	
Grade Checker	LV PAVE			2		ER	
Operator	LV PAVE			1		ER	
Traffic Control	LV PAVE			1		ER	Traffic control and Maintenance 4 times a day.

**Totals:** 1 1 13 1



# City of Las Vegas-Const Management

## DAILY REPORT

333 N. Rancho Dr.  
Las Vegas, NV 89106

No. 008

Phone: (702)229-5373 Fax: (702)382-3901

### MATERIALS DELIVERED

Time	Material Name	Quantity	Remarks	Ticket No	Description	Location
2 pm	613.01	42	1 - Elkhorn Rd .& Unicorn NE Corner - 42 LF.		"L" C & G	ER
2 pm	613.02	656	1 - E R & Decatur Blvd, SE Corner - (37 x 6.5), 241 SF.		Sidewalk	ER
			2 - E R. and Unicorn, NEC -(42 x5.5 ), 220 Sf. 3 - ER & Leon, NWC and NEC - (26 x 5) + ( 13 x 5), 195 SF. Total sidewalk poured 656 SF.			
2 pm	613.03	9	1 - E R & Thom Blvd., NWC - 1  2 - E R & Bradley, NWC ,SWC and SEC - 3. 3 - ER & Jeannette, SEC - 1 4 - ER & Leon, NWC and NEC - 2 5 - EF & Boyd NEC 1. 6 - ER & RainbowBlvd. NWC - 1		Warn Panel	ER

Certified By:City of Las Vegas-Const Management

Date: 10/27/2016

Signed: \_\_\_\_\_

Oscar M. Bermudez

PROJECT NAME:

DATE:

Bid Number:

### PRE-ACTIVITY MEETING AGENDA

#### Attendees

Name	Signature	Initials	Organization

#### Materials

Submittal Number	Material Description	Status and Exceptions

#### Mix Designs

Mix ID	Type Of Material	Status and Exceptions

#### Outstanding Deficiency Check


#### Review of Plans and Spec

Contract Plans		UDACS	
Special Provisions		NDOT	
Standard Specs		Other	

#### Control Measures

Type of Inspection/Testing	Responsible Party's Name	Frequency
Traffic Control		
General Item Inspections		
Specific Inspections		
Specific Inspections		
Specific Inspections		
Testing		
Testing		
Testing		

#### Extra Care Items

Name	Material Type	Responsible Party

#### "What to do if something goes wrong"


#### "Ways to maintain proper notification"








## Quality Control Audit

QC Procedures

**COMPLIANT**

<b>Date of Audit:</b>	00-Jan-00	<b>Bid Number:</b>	Contractor	comment ONLY	Compliance	Non-Compliance	Not Applicable	QC Inspection:	0
<b>Audit By:</b>	0	<b>Project Name:</b>	0					QC Lab:	0
<b>Audit No:</b>	0	<b>RPC:</b>	0					<b>COMMENTS</b>	
<b>Section 111 General</b>									
<b>Section 111.01 Personnel and certifications</b>									
	Is the Foreman the inspector?					X			
	Demerits for QC non-compliance							<b>\$ 100 Demerits</b>	
<b>Section 112 Contractor Quality Control Administration</b>									
<b>Section 112.04 Documentation Process</b>									
<b>Section 112.04.01 File Maintenance</b>									
	Protected in a manner to prevent damage, deterioration, or loss?					X			

# QC Administration Audit Form EXAMPLE

 <b>Quality Assurance Administration Audit</b>										COMPLIANT		COMPLIANT					
Date of Audit:	00-Jan-00	Bid Number:	Contractor	comments	QC Compliance - C	QC Non-Compliance	Not Applicable	QA Comments ONLY	QA Compliance - C	QA Non-Compliance	Not Applicable	QC Inspection:	0	Project Engineer:	0	QA Lab:	0
Audit By:	0	Project Name:	0									QC Lab:	0	County Rep:	0	QA Inspection:	0
Audit No:	0	RPC:	0									QC COMMENTS		QA COMMENTS			
<b>Section 112.06 Material Delivery &amp; Tracking Procedure</b>																	
<b>QA</b>	Demerits for QC non-compliance										<b>\$ 2000 Demerits</b>						
<b>Section 112.11 QC Auditing Procedures</b>																	
Are internal audits documented monthly for projects over 90 calendar days in length?						X				X							
Are the testing and inspection forms being used?						X					X						
<b>Section 114.04.03 Activity Cards</b>																	
Section 4: Testing and Sampling Requirements						X				X							
<b>Section 114.08 Inspection Reports</b>																	
Does it appear that there is written evidence of observation of the Quality Control and Quality Assurance tests performed with narrative documentation of the observation							X				X						
Review all field and lab test data						X				X							
<b>QA</b>	Demerits for QC non-compliance										<b>\$ 600 Demerits</b>						

# QA Administration Audit Form EXAMPLE

**Table 1**  
**CLV Materials Testing and Sampling Frequencies - Nov 2017**  
**Aggregate and Backfill Materials**

Spec Section	Description	Proctor AASHTO T180*	R-Value AASHTO T190	Sieve AASHTO T27* & T11*	PI AASHTO T89 & T90*	Solubility AWWA 4500E and 3500-NaD	Compression Samples Per RTC 704.03.07	Field Density		
								Riding Equipment	Walk Behind Equipment	
203 Excavation & Embankment	203.02.02	Drainage Excavation (Subgrade)	1/Type		1 / 1000 yd <sup>3</sup>			1 / 5000 ft <sup>2</sup> / Lift	1 / 1000 ft <sup>2</sup> / Lift	
	203.02.03	Channel Excavation (Subgrade)	1/Type		1 / 1000 yd <sup>3</sup>			1 / 5000 ft <sup>2</sup> / Lift	1 / 1000 ft <sup>2</sup> / Lift	
	203.02.04	Borrow	1/Type	1/Type	1 / 1000 yd <sup>3</sup>			1 / 5000 ft <sup>2</sup> / Lift	1 / 1000 ft <sup>2</sup> / Lift	
	203.02.05	Selected Borrow	1/Type	1/Type	1 / 1000 yd <sup>3</sup>			1 / 5000 ft <sup>2</sup> / Lift	1 / 1000 ft <sup>2</sup> / Lift	
	203.03.01	Roadway (Subgrade)	1/Type		1 / 1000 lf			1 / 5000 ft <sup>2</sup> / Lift	1 / 1000 ft <sup>2</sup> / Lift	
	203.03.10	Selected Material	1/Type	1/Type	1 / 1000 lf			1 / 5000 ft <sup>2</sup> / Lift	1 / 1000 ft <sup>2</sup> / Lift	
	203.03.15	Foundation (Subgrade)	1/Type		1 / 500 yd <sup>3</sup>			1 / 500 ft <sup>2</sup> / Lift	1 / 100 ft <sup>2</sup> / Lift	
	203.03.18	Compaction, Dirt Embankment	1 / 10,000 yd <sup>3</sup> Per Type		1 / 1000 yd <sup>3</sup>			1 / 5000 ft <sup>2</sup> / Lift	1 / 1000 ft <sup>2</sup> / Lift	
	203.03.19	Compaction, Rock Embankment	Due to Material Properties an Engineering Report Documenting Compactive Effort is Required (See Special Provisions)							
	203.03.73	Compacted Fill (Detention Basin)	1 / 10,000 yd <sup>3</sup> Per Type		1 / 1000 yd <sup>3</sup>		1 / 10,000 yd <sup>3</sup> Per Type		1 / 5000 ft <sup>2</sup> / Lift	1 / 1000 ft <sup>2</sup> / Lift
206 Structure Excavation	206.01.01	Structure Excavation	1/Type		1 / 1000 yd <sup>3</sup>			1 / 500 ft <sup>2</sup> / Lift	1 / 100 ft <sup>2</sup> / Lift	
	206.03.01									
207 Structure Backfill	207.02.01	Selected Backfill	1 / 10,000 yd <sup>3</sup> Per Type		1 / 1000 yd <sup>3</sup>		1/Source	1 / 500 ft <sup>2</sup> / Lift	1 / 250 ft <sup>2</sup> / Lift	
	207.02.02	Granular Backfill	1 / 10,000 yd <sup>3</sup> Per Type		1 / 1000 yd <sup>3</sup>		1/Source	1 / 500 ft <sup>2</sup> / Lift	1 / 250 ft <sup>2</sup> / Lift	
208 Trench Excavation & Backfill	208.02.02	Selected Backfill	1 / 10,000 yd <sup>3</sup> Per Type		1 / 1000 yd <sup>3</sup>		1/Source	1 / 100 lf / Lift		
	208.02.03	Granular Backfill	1 / 10,000 yd <sup>3</sup> Per Type		1 / 1000 yd <sup>3</sup>		1/Source	1 / 100 lf / Lift		
	208.02.04	Sand Backfill			1 / 1000 yd <sup>3</sup>		1/Source			
	208.02.05	Type II Aggregate Base (Trench)	Sampling Per Section 704						1 / 100 lf / Lift	
	208.02.06	Drain backfill								
	208.02.07	Type I and II CLSM (Flowable Fill)	Aggregate Sampling Per Section 704						1/300 yd <sup>3</sup> /Day	
	208.02.09	Type III CLSM (BAF)							1/300 yd <sup>3</sup> /Day	
301 Selected Material	301.02.01	Select Subbase	1/Type	1 / Type	1 / 1000 yd <sup>3</sup>		1/Source	1 / 5000 ft <sup>2</sup> / Lift	1 / 1000 ft <sup>2</sup> / Lift	
302 Aggregate Base Course	302.02.01	Type II / I Aggregate Base	Sampling Per Section 704						1 / 5000 ft <sup>2</sup> / Lift	1 / 1000 ft <sup>2</sup> / Lift

**Table 1**  
**CLV Materials Testing and Sampling Frequencies - Nov 2017**  
**Aggregate and Backfill Materials - Continued**

Spec Section		Description	Proctor AASHTO T180*	Sieve AASHTO T27* & T11*	PI AASHTO T89* & T90*	Sand Equivalent ASTM D2419*	Cement Content NDOT T239	Compressive Strength NDOT T237	Field Density	
									Riding Equipment	Walk Behind Equipment
304 Cement Treated Base	304.02.01	Cement Treated Base	Per Special Provisions	1 / 2000 Ton				1 / Day	1 / 5000 ft <sup>2</sup>	1 / 1000 ft <sup>2</sup>
	Spec Section		Description	Proctor AASHTO T180*	R-Value AASHTO T190	Sieve AASHTO T27* & T11*	PI AASHTO T89* & T90*	Fractured Faces NDOT T230	So.I Sulfates AWWA 4500E and 3500-NaD	LA Abrasion ASTM C131 (500 Rev)
704 Base Aggregates	704.03.02	Drain Backfill			1 / 1000 yd <sup>3</sup>				1 / Source	
	704.03.03	Type I Aggregate Base	1 / 10,000 yd <sup>3</sup> Per Type	1 / Type	1 / 1000 yd <sup>3</sup>				1 / Source	
	704.03.04	Type II Aggregate Base	1 / 10,000 yd <sup>3</sup> Per Type	1 / Type	1 / 1000 yd <sup>3</sup>			1 / Source	1 / Source	
	704.03.05	Type III Aggregate	1 / 10,000 yd <sup>3</sup> Per Type		1 / 1000 yd <sup>3</sup>			1 / Source		
	704.03.06	Crushed Rock			1 / 1000 yd <sup>3</sup>		1 / 1000 yd <sup>3</sup>	1 / Source	1 / Source	
	704.03.07	CLSM Aggregate (Type I, II, & III)			1 / 1000 yd <sup>3</sup>					
	704.03.08	Aggregates for PC Treated Base	1 / Type		1 / 1000 yd <sup>3</sup>				1 / Source	
	704.03.09	Shouldering Material			1 / 1000 yd <sup>3</sup>					
	704.03.10	Agg. Base with RAP and Concrete	1 / 2,000 yd <sup>3</sup> Per Type	1 / Type	1 / 1000 yd <sup>3</sup>			1 / Source	1 / Source	1/2000 yd <sup>3</sup>

**Table 1**  
**CLV Materials Testing and Sampling Frequencies - Nov 2017**  
**Asphalt Cement Pavement Products and Surfaces**

Spec Section		Description	Material Sampling	Prime Coat	Tack Coat	Field Density		Surface Tolerances	Binder	
						Field Density Mat Testing	Field Density Joint Testing			
400 Asphalt Rubber Pavement	400.01	Asphalt Rubber Pavement Surface	Per Sec 401	Manufacturer Certificate of Compliance		1 / 5000 ft <sup>2</sup> / Lift / Day	1 / 400 lf / Lift / Day	Per Special Provisions	Manufacturer Certificate of Compliance	
	Spec Section		Description	Rice AASHTO T209*	Oil Content by Extraction AASHTO T164	Sieve AASHTO T30*	Marshall Stability & Flow AASHTO T209	TSR AASHTO T283	Air Void Content AASHTO T269	Coldfeed Sample
401 Plantmix Bituminous Pavements	401.03.12	Plantmix Bituminous Pavement Sampling and Testing		1 / 750 Tons / Day			1 / Day	1 / 750 Tons / Day	Manufacturer Certificate of Compliance	

**Table 1**  
**CLV Materials Testing and Sampling Frequencies - Nov 2017**  
**Asphalt Cement Pavement Products and Surfaces - Continued**

Spec Section		Description	Material Sampling	Prime Coat	Tack Coat	Field Density		Surface Tolerances	Binder	
						Field Density Mat Testing	Field Density Joint Testing			
402 Plantmix Bituminous Surface	402.03	Plantmix Bituminous Surface	Per Sec 401	Manufacturer Certificate of Compliance		1 / 5000 ft <sup>2</sup> / Lift / Day	1 / 400 lf/ Lift / Day	Per Special Provisions	Manufacturer Certificate of Compliance	
Spec Section		Description	Material Sampling	Field Density			Surface Tolerances			
				Mat Testing	Joint Testing					
404 Hot Plantmix Recycled Bit. Pavement	404.03	Recycled Bituminous Surface	Per Sec 401	1 / 5000 ft <sup>2</sup> / Lift / Day		1 / 400 lf/ Lift / Day		Per Special Provisions		
Spec Section		Description	Sampling							
405 - 407 Tack, Prime, Seal Coat	405 -407	Tack, Prime, Seal Coat Surface Treatment	Manufacturer Certificate of Compliance							
Spec Section		Description	PMM Application Rate RTC 413.03.06	Oil Content by Extraction AASHTO T164	Sieve AASHTO T30	Yield Verification	Surface Tolerances	Binder	PMM Sample	Cold Feed
413 Plantmix Gap-Graded Surface (UTACS)	413.03.06	Ultra Thin Asphalt Cement Surface (UTACS)	2 / Day Min.	3 / Day	3 / Day	Twice / Day (Mid Day and End of Shift)	See Special Provisions	Manufacturer Certificate of Compliance	Manufacturer Certificate of Compliance	3 / Day
Spec Section		Description	Sieve AASHTO T27* & T11*	Methylene Blue AASHTO TP57	Fine Agg Angularity AASHTO T304	Fractured Faces AASHTO T335	LA Abrasion ASTM C131 (500 Rev)	Elongation @ 5:1 ASTM D4791	Soundness ASTM C88	
705 Aggregates Bituminous Courses	705.03	Plantmix Base and Surface Agg.	1 / 750 Tons / Day				1 / Source			
Spec Section		Description	Sieve AASHTO T27* & T11*	Fractured Faces ASTM D5821	Methylene Blue AASHTO TP57	Uncompacted Void Content AASHTO T304	Sand Equivalent AASHTO T176	LA Abrasion ASTM C131 (500 Rev)	Elongation @ 3:1 ASTM D4791	Soundness ASTM C88
705 Aggregates for UTACS	705.03.08	UTACS Coarse and Fine Aggregate	3 / Day	1 / Day	1 / Day	1 / Day	1 / Source			

**Table 1**  
**CLV Materials Testing and Sampling Frequencies - Nov 2017**  
**Portland Cement Concrete Pavement, Materials, and Structures**

Spec Section		Description	Slump ASTM C172*	Unit Weight and Yield ASTM C138*	Air Content Pressure Method	Concrete Compression	Concrete Beams Nev T442		Plant Inspection	Aggregate Sampling
409 Portland Cement Concrete Pavement	409.00.00	Portland Cement Concrete Pavement	1 / 300 yd <sup>3</sup> / Day				1 / 750 yd <sup>3</sup> / Day		Continuous	1 / 500 yd <sup>3</sup> / Day
	Spec Section		Description	Slump ASTM C172*	Unit Weight and Yield ASTM C138*	Air Content Pressure Method	Concrete Compression		Unauthorized Sources	
501 - 502 Portland Cement Concrete and Structures	501.02.04	Portland Cement Concrete	1 / 100 yd <sup>3</sup> / Day						Continuous	1 / 500 yd <sup>3</sup> / Day
	502.01.01	Portland Cement Concrete	1 / 100 yd <sup>3</sup> / Day						Continuous	1 / 500 yd <sup>3</sup> / Day
Spec Section		Description	PCC Testing	Tests for Popouts ASTM C330	Freezing and Thawing ASTM C666	Dry Unit Weight ASTM C567	Unit Weight & Cement Factor ASTM C138	Air Content Vol. Method (Lw Concrete)	Unauthorized Sources	
504 Lightweight Concrete	504.02.03	Lightweight Portland Cement Concrete	Section 501	1 / 100 yd <sup>3</sup> / Day	1 / 100 yd <sup>3</sup> / Day	1 / 100 yd <sup>3</sup> / Day	1 / 100 yd <sup>3</sup> / Day	1 / 100 yd <sup>3</sup> / Day	Continuous	1 / 500 yd <sup>3</sup> / Day
	Spec Section		Description	Submittal						
505 Reinforcing Steel	505.02.02	#4 Bars and Larger	Mill Certification							
	Spec Section		Description	Gradation Visual	LA Abrasion (500 Rev) ASTM C131	Bulk Specific Gravity ASTM C127				
610 Rip- Rap	610.02.04	RipRap	1 / Shipment	1 / Source	1 / Source					
	Spec Section		Description	Field Density Subgrade & Aggregate base		Portland Cement Concrete Refer to Section 501				
613 Curb, Sidewalk, Gutter, & Driveway	Varies	Curbs	1 / 100 lf / Day		1 / 100 yd <sup>3</sup> / Day					
		Sidewalk	1 / 100 lf / Day		1 / 100 yd <sup>3</sup> / Day					
		Driveways / Spandrels	1 / 250 ft <sup>2</sup> / Day		1 / 100 yd <sup>3</sup> / Day					

**Table 1**  
**CLV Materials Testing and Sampling Frequencies - Nov 2017**  
**Portland Cement Concrete Materials and Structures - Continued**

Spec Section		Description	Sieve AASHTO T27* & T11*	Fractured Faces NDOT T230	LA Abrasion ASTM C131 (100 & 500)	Soundness Sodium Sulfate AASHTO T104	Clay Lumps AASHTO T112	C.V. Cal Trans 227	Organic Impurities ASTM C40	Bulk Specific Gravity
706 Aggregates for Portland Cement Products	706.03.01	Coarse Aggregate	1 / 500 yd <sup>3</sup>	1 / 500 yd <sup>3</sup>	1 / Source	1 / Project	1 / Project	1 / 500 yd <sup>3</sup>		1 / Source
	706.03.02	Lightweight Aggregate	1 / 500 yd <sup>3</sup>					1 / 500 yd <sup>3</sup>	1 / Source	1 / Source
		Description	Sieve AASHTO T27* & T11*	Sand Equivalent ASTM D2419*	Soundness Sodium Sulfate AASHTO T104	Organic Impurities ASTM C40	Lightweight Pieces AASHTO T113			Bulk Specific Gravity
	706.03.03	Fine Aggregate	1 / 500 yd <sup>3</sup>	1 / 1000 yd <sup>3</sup>	1 / Project	1 / Source	1 / 500 yd <sup>3</sup>			1 / Source
	706.03.04	Grout and Mortar Sand	1 / 500 yd <sup>3</sup>			1 / Source				1 / Source
Spec Section		Description	Submittal							
713 Reinforcement	713.03.01	Deformed Steel Bars	Mill Certification							
		Spiral Reinforcement	Mill Certification							

**Table 1**  
**CLV Materials Testing and Sampling Frequencies - Nov 2017**  
**Notes:**

**General Notes**

- Note 1: The Engineer may request additional testing not to exceed a maximum of 10% of the required testing for any type performed.
- Note 2: Refer to project special provisions for concrete sampling and testing requirements on placement quantities less than 3 yd<sup>3</sup>/ day and less than 50 yd<sup>3</sup>/ week.
- Note 3: The specified density testing frequencies are based on a per lift basis. For example an embankment fill of 7500 ft<sup>2</sup> per lift requires a min of 2 tests per lift.
- Note 4: Soluble Sulfate testing is required on soil in contact water lines, concrete structures, metal pipe, and fittings.

\* For federal projects, testing methods listed in the latest NDOT approved version of the City of Las Vegas Construction Quality Program may be used. For projects within NDOT right of way, NDOT test methods are required.