



LOWER MANHATTAN DEVELOPMENT CORPORATION

INVITATION TO BID

for

WORLD TRADE CENTER MEMORIAL TREE ACQUISITION, INSTALLATION AND MAINTENANCE

*Lower Manhattan Development Corporation, a subsidiary of the
New York State Urban Development Corporation,
d/b/a Empire State Development Corporation,
seeks bids for one entity to handle the selection, tagging, acquisition, digging, transfer, delivery,
installation and maintenance of the trees for the World Trade Center Memorial.*

Lower Manhattan Development Corporation

John C. Whitehead, Chairman
Stefan Pryor, President

May 9, 2006

A mandatory pre-bid conference will be held on Friday, May 19, 2006 at 9:00 AM at LMDC's offices located at One Liberty Plaza, 20th Floor, New York, NY 10006. Questions must be submitted in writing and received by LMDC no later than Friday, June 2, 2006 to Emily Brown by e-mail at ebrown@renewnyc.com, by mail to LMDC, or by facsimile to (212) 962-2431. An addendum to this Invitation to Bid, including responses to any questions, will be posted on the LMDC web site at www.renewnyc.com by June 12, 2006. LMDC will not accept, and cannot respond to, questions via other methods. Any additional addenda will be posted no later than June 30, 2006.

WTC Memorial Trees

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I. GENERAL INFORMATION

A. Project Background

On September 11, 2001, terrorist attacks destroyed every structure on the World Trade Center site: World Trade Center office towers, commercial and government low-rise buildings, the hotel and underground concourse, PATH terminal and subway stations. Almost immediately after the tragic events, a broad public consensus emerged that a fitting memorial be created at the site and that it be the defining element of the rebuilding process. The core of the non-commercial redevelopment at the site of the former World Trade Center in Lower Manhattan was defined to be the World Trade Center Memorial (the “Memorial”) and World Trade Center Memorial Museum (the “Memorial Museum”), and related cultural facilities that would draw visitors from around the world and bring new activity to this historic site.

The Lower Manhattan Development Corporation (“LMDC”) was created in the aftermath of September 11th to coordinate the remembrance, rebuilding, and revitalization efforts. It has completed land use, environmental, historic preservation and other required reviews. LMDC has also conducted an international design competition resulting in the selection of a winning Memorial design, *Reflecting Absence*, by architect Michael Arad and landscape architect Peter Walker.

The World Trade Center Memorial Foundation, Inc. (the “Foundation”) in cooperation with and as designated by the LMDC, is the entity responsible for the construction and subsequent operation of these facilities. The Foundation and the LMDC are working closely together on the projects with the expertise, experience and resources of the best of New York’s construction industry.

The building of the Memorial represents an opportunity for a contractor to play a critical role in the creation of what will be one of the country’s most important and hallowed landmarks. Accordingly, it is the expectation that each entity interested in this project is prepared to put forth their absolute best people and teams. The lasting impact of this successful effort will be felt far into the future as it is projected that millions of visitors will come to Lower Manhattan each year to visit the World Trade Center site.

The Memorial that we seek to erect will ensure that future generations never forget the thousands of people who died on September 11th, 2001 in New York, in Shanksville, Pennsylvania and at the Pentagon, as well as those who died in the terrorist bombing at the World Trade Center on February 26, 1993. The Memorial Museum will tell the story of the events of September 11th—both the horror of the attacks and the heroism in their aftermath.

B. Overview of the Work and the Submission Process

In connection with the building of the Memorial and the Memorial Museum, LMDC will need to obtain the services of an entity (which may be a joint venture—see below) to perform the selection, tagging, acquisition, digging, transfer, delivery, installation and maintenance of the WTC Memorial Trees (the “Work”) for the Memorial. Entities interested in submitting a bid to provide the Work are required to follow the guidelines and instructions contained in this

Invitation to Bid. In the event it becomes necessary to revise any part of this Invitation to Bid, revisions will be provided by addenda posted on the LMDC web site www.renewnyc.com.

LMDC will administer this Invitation to Bid, review the bids, select the successful bidder, and award the Contract. However, the Contract may be signed by LMDC and subsequently assigned to the Foundation. Hence, upon such assignment, references to "LMDC" in this Invitation to Bid shall mean and include "and/or the Foundation." Thereafter, also, the Contract may be assigned to the construction manager or general contractor for the Memorial and Memorial Museum—see the form of Trade Agreement attached to this Invitation to Bid.

Bid proposals should provide a straightforward, complete and concise description of the entity's capabilities and qualifications to perform the Work. Please prepare eight (8) copies of your bid proposal. Each copy of the bid proposal should be bound in a single volume and include any documentation you may wish to submit.

Any entity submitting a bid proposal in response to this Invitation to Bid may be required to give an oral presentation of its qualifications to LMDC. This oral presentation may provide an opportunity for the entity to clarify or elaborate on its qualifications but will in no way change the original submission. Engagement staff should be present at the oral presentation. LMDC's request for an oral presentation shall not constitute retention of the entity for this Work or for future services.

Bid proposals must be received no later than 5:00 PM EST, July 17, 2006. Deliver all bid proposals to:

**RFP/ITB Processor
Lower Manhattan Development Corporation
1 Liberty Plaza, 20th Floor
New York, NY 10006
Attn: Tree Procurement and Related Services ITB**

Proposals are considered confidential. Your proposal, properly executed, should be prepared and submitted in a sealed package that is clearly identified on the outside of the proposal, stating the project name and trade. Bid proposals rendered in the form of a telegram, telephone, telefax or electronic transmission will not be accepted. Changes to early submitted bid proposals will be received in a sealed package, as marked above, indicating whether the changes supplement or replace the previous submission, and detailing which parts of the original proposal were changed, so long as the proposal changes are delivered at the location specified before the bid due date and time. Any proposal or changes received after the above stipulated bid due date and time will not be considered.

We welcome suggestions regarding changes in specifications and/or modifications in design or production methods which will aid in reducing costs without impairing quality or safety, or which will improve the quality, safety, schedule and/or performance of the Work. However, your base bid price must be submitted on the basis of the bid documents. All voluntary alternates are to be presented as a separate deduction from or addition to the base bid price.

LMDC shall have no obligation to disclose to any entity the results of the bid process or of their determinations, except that LMDC shall notify the entity in writing if such entity is not awarded the contract.

The award of the contract shall not be construed as a guarantee by LMDC that the amount of the bid, equipment and the general scheme of operations and other data submitted by bidder with or after its bid proposal is either adequate or suitable for the satisfactory and timely performance of the Work.

LMDC reserves the right to cancel this Invitation to Bid at any time, to reject any bid or all bids, to negotiate with any or all bidders, to waive any informality or irregularity in any bid received or to afford any bidder an opportunity to remedy any deficiency resulting from any informality or irregularity. LMDC assumes no obligation, no responsibility and no liability for costs incurred by the responding entities prior to the issuance of a contract.

LMDC may at its election deny permission to modify, explain, withdraw or cancel any bid or part thereof after the time designated for the opening of bids.

The current schedule for this effort is as follows:

- May 1, 2006 – Advertisement
- May 9, 2006 – Invitation to Bid Issued/Document Pick-Up
- May 19, 2006 – Mandatory Pre-Bid Conference
- June 2, 2006 – Last date for submission of written questions
- June 12, 2006 – Answers to submitted questions to be posted on LMDC web site.
- July 10, 2006, 5:00 p.m. – Bids Due
- July 17 – July 21, 2006 – Interviews of Finalists/Oral Presentations Conducted (if necessary)
- August 9, 2006 – Qualified Entity Selected
- August 11, 2006 – Contract Awarded

C. Pre-Bid Meeting

You are requested to attend a **MANDATORY** Pre-Bid Meeting scheduled for:

Time: 9:00 AM EST
Date: May 19, 2006
Location: LMDC, One Liberty Plaza, 20th Floor, New York, NY 10006

Attendance at the mandatory Pre-Bid Meeting is a condition to submission of a bid. Bidders must register for the mandatory Pre-Bid Meeting by no later than 12:00PM, Thursday May 18, 2006 in the form of an e-mail addressed to Emily Brown at ebrown@renewnyc.com.

II. ANTICIPATED SCOPE OF WORK

LMDC requests bid proposals for an entity to perform the Work, which will include, but will not be limited to, the selection, tagging, acquisition, pre-installation preparation, digging of trees, pre-installation delivery to the Tree Holding Facility, pre-installation maintenance at the Tree Holding Facility, delivery to and installation at the Project Site and post-installation maintenance at the Project Site of the WTC Memorial Trees, and all other Work required in connection with the Project and as otherwise described in the Scope of Work, the Specifications, and the other Contract Documents. The project schedule referenced in Section 02931 of the Specifications anticipates selection and tagging of trees in summer of 2006, phased installation of trees between October 2008 and July 2010, and a 24-Month post-installation tree maintenance period.

The "Contract Documents" are defined in Article 1 of the Trade Agreement attached to this Invitation to Bid. Words and phrases defined in the Contract Documents have the same meaning in this Invitation to Bid.

To assist the entities in preparing their proposals, we have included with this Invitation to Bid construction drawings and specifications prepared by Peter Walker and Partners Landscape Architecture, Inc. for the Work.

III. SUBMISSION REQUIREMENTS

Interested entities are invited to submit bid proposals that contain the following information:

- A. Experience, Structure, and Personnel (ten-page limit)
1. A history of the entity's experience performing projects similar to the Work, including the specifics outlined in Section II above, for economic development organizations, municipalities, other governmental entities, private developers, not-for-profits, civic organizations, or other similar Persons.
 2. A description of the entity's organizational structure, including resumes of the principals, project manager(s), superintendents and professional staff who would work directly with LMDC, and the proposed percentage of time each individual would work directly on this Project. For joint ventures, partnerships or other special purpose entities created for this Project, submit the above information for each partner/venturer/member of the entity.
 3. Descriptions of three (3) major projects, within the last five (5) years, that the entity has completed that are comparable to the Work-- specifically on projects with a high level of public scrutiny. Include the client, the name of a contact person who is able to provide a reference, a description of the nature of the work, the size and complexity of the project, and the original contract sum and final sum including change order payments.

4. Any other information that you believe would make the entity's work on behalf of LMDC superior to that of other entities or information about your entity's specialty or particular skill to perform the Work.
5. If you are a partnership, joint venture or other special purpose entity created for this Project:

Describe what form of legal entity you are and which persons have authority to bind the entity;

Describe the individual entities that comprise the partnership/joint venture/ special purpose entity.

If the bidder is a joint venture, information about any previous joint venture projects with any partner/venturer/member of the proposed bidder—also, whether the project was completed on time, and within budget. (Indicate, also, if there were lawsuits between any partners/venturers/members and/or the owner.)

NOTE: No particular company may be a partner/venturer/member of more than one partnership/joint venture/special purpose entity submitting a bid proposal. LMDC will evaluate each partner/venturer/member of a partnership/joint venture/special purpose entity both separately and as a part of the partnership/joint venture/special purpose entity. LMDC may reject a bid from any partnership/joint venture/special purpose entity comprised of more than two entities.

NOTE: Bidders should include as part of the foregoing information covered under Section IV below.

B. Bid Form (Attachment 4)

Complete the Bid Form (Attachment 4), including setting forth:

1. The lump sum price for the Work, per the Bid Form attached as Attachment 4 (Bid Form).
2. Any reduced prices offered to other municipalities, governmental entities, economic development or nonprofit organizations, and civic organizations.
3. Unit prices, alternate prices, and/or allowances required in Attachment 4 (Bid Form).
4. A statement of the cost for all insurance included by the bidder in the above lump sum price to be provided by the bidder pursuant to Schedule "G" to the General Conditions, itemized by type of coverage. If an Owner Controlled Insurance Program ("OCIP"—as described in Part Two of such Schedule "G") is elected, such total cost will be deducted from the lump sum.

NOTE: The information listed in III.B.1-4 above should be included in a separate sealed envelope accompanying the bidder's response to this Invitation to Bid. Although the proposed lump sum price (and the other items referred to above) will be taken into account, LMDC reserves the right to negotiate a lower or different compensation structure with any entity and reserves the right to award to other than the lowest bidder (see below).

C. Contact Information

On a single cover sheet in your statement of qualifications, please provide:

1. The lead entity* name;
2. The lead entity's contact person;
3. License or certification information of lead entity principal(s) or individual(s) that are anticipated to work on an LMDC project;
4. Telephone, fax, and cell phone numbers for entity principal(s) or individual(s) that are anticipated to work on an LMDC project;
5. E-mail address for entity principals or individuals that are anticipated to work on an LMDC project;
6. The street address of lead entity;
7. The year the lead entity was established;
8. The M/WBE status of the lead entity (Minority-owned Business Enterprise or Women-owned Business Enterprise, as certified by New York State);
9. The type of work or specialty and size of lead entity; and
10. The signature of the person authorized to sign for the lead entity, and the date of the signature.

D. Conflicts of Interest

1. Submit a statement describing any potential conflict of interest or appearance of impropriety, relating to other clients of the entity (including, but not limited to, projects located in Lower Manhattan (defined as the area south of Houston Street) or officers, directors, and employees of LMDC, that could be created by working for LMDC.
2. Indicate what procedures will be followed to detect and notify LMDC and to resolve any conflicts of interest.

* Which may be a joint venture, as noted.

3. Indicate any pending litigation and/or regulatory action by any oversight body or entity that could have an adverse material impact on the entity's ability to serve LMDC.
4. Indicate if the entity has ever had a prior contract with any governmental entity terminated for any reason, and provide a detailed explanation.
5. Submit a completed Standard Business Background Questionnaire (Attachment 3).
6. Submit a completed Contractor Disclosure Contacts Form, Model Language to Obtain Offerer's Affirmation of Understanding of and Agreement pursuant to State Finance law Section 139-j (3) and Section 139-j (6) (b), and the Offerer Disclosure of Prior Non-Responsibility Determinations Forms (Attachment 5) in compliance with New York State Executive Order 127.
7. Identify the entity's proposed insurance carriers and issuers of the Bonds.
8. Provide information for any other Lower Manhattan projects or work related to the World Trade Center.

E. Nondiscrimination Policy and M/WBE

1. Entities with fifty (50) or more employees shall submit a copy of their nondiscrimination or affirmative action plan.
2. Entities with less than fifty (50) employees shall submit a statement of their commitment to equal opportunity and affirmative action from their chief executive officer.
3. Each responding entity (including each member of a partnership/joint venture/special purpose entity) and all proposed subcontractors must also complete and submit both (a) Attachment 1 (Workforce Employment Utilization Report) relating to the anticipated workforce to be utilized on the project, and (b) Attachment 2 (MBE/WBE Compliance Report) relating to the anticipated participation of minority and women-owned business enterprises as subcontractors, if any. Please provide a detailed M/WBE plan and a plan for utilizing minorities and women on this Project, as required by the Opportunity Downtown Plan (see Schedule "F" of the General Conditions).

F. Proposed Subcontractors

1. Each responding entity shall submit a list of any proposed subcontractors, and the amounts of each such subcontractor proposal, along with a completed Standard Business Background Questionnaire (Attachment 3) for each such proposed subcontractor.

2. Entities are cautioned that all proposed subcontractors must meet all the requirements set forth in the form of contract accompanying this Invitation to Bid. **If a proposed subcontractor submitted with your bid is disapproved for any reason, the successful bidder must provide an alternate subcontractor, acceptable to LMDC, at no additional cost to LMDC.**

G. Bid Bond

Each responding entity must submit two originals of the Bid Bond in the form set forth in Attachment 6 (Bid Bond).

H. Evidence of Insurance.

Each responding entity must submit evidence of their ability to secure the insurance and Bonds required by LMDC, as set forth in Schedule G and Exhibit "1" of the General Conditions.

I. Project Approach and Methodology

Each responding entity must submit Attachment 7 (Project Approach and Methodology), which must describe how Contractor intends to complete the project from Start to Finish, including but not limited to the following:

1. Location of Tree Holding Facility
2. Proposed methodology for tagging, digging, boxing, and transporting trees to Tree Holding Facility.
3. Proposed methodology for maintenance of trees at Tree Holding Facility.
4. Proposed methodology for transporting trees to the WTC Site.
5. Proposed methodology for planting trees at WTC Site.
6. Proposed methodology for post installation maintenance of trees at WTC Site.
7. List of Permits required for this project.

J. Owner Supplied Trees

Notify the Owner in writing of any unsatisfactory conditions observed that do not allow the Five (5) Owner Supplied Sweet Gum Trees be warranted as indicated in Section 02931 of the Specifications.

K. Comments on Contract

The entity should indicate what specific text changes, if any, it would request in the forms of Contract Documents accompanying this Invitation to Bid. While LMDC will evaluate requested changes, LMDC will have no obligation to accept

any changes in the Contract Documents and will not be deemed to have accepted any requested changes by selecting Contract's bid proposal.

All information and documents described in subsections A through K above must be included or addressed in the submission.

IV. CRITERIA FOR SELECTION

- A. Because of the special complexity and coordination requirements of this Project, LMDC will select the Contractor based on factors demonstrating such Contractor's responsibility and experience with complex projects involving compliance with strict Legal Requirements. For this reason, LMDC expressly reserves the right to award to other than the low bidder. Among the factors which LMDC will apply in making its final selection, not necessarily in order of importance, are the following.
1. Experience of the entity on comparable projects. List three such jobs, including (a) number, complexity, and nature of projects in New York City similar to the Project handled by the entity; (b) complex, large scale projects; (c) experience of entity in performance on similar projects for municipalities, economic development organizations, or other governmental entities, comparable governmental organizations in New York City and comparable qualification requirements.
 2. Experience of entity's employees, to be assigned to this Project by or for the entity, and the entity's selected staff ability, experience, availability and facility for working with LMDC's directors, officers, staff and consultants.
 3. Demonstrated knowledge of the construction issues facing Lower Manhattan and the WTC Site and familiarity with local, state, and federal environmental regulations and other Legal Requirements applicable to the Project.
 4. Quality of entity's work product as demonstrated through references from owners of other projects of a similar nature (or other documentary evidence), including (a) quality of work; (b) demonstrated record of safety and safe performance; and (c) innovative or outstanding work by entity that demonstrates the entity's unique qualifications to perform the Work.
 5. Quality/responsiveness of bid proposal, including (a) responsiveness to this Invitation to Bid; (b) responsiveness to the requirements of the Contract Documents, (c) approaches in proposed methodology that demonstrate maximum comprehension of and ability to successfully complete the Project in accordance with the Contract; and (d) conformity with or exceedance of applicable LMDC policies as set forth in the Contract, including specific policies relating to nondiscrimination, M/WBE requirements, and Opportunity Downtown Plan.

6. Amount of Lump Sum bid and also amounts and rates for other dollar factors required by this Invitation to Bid.
7. Willingness to accept the forms of Agreement, General Conditions, and other Contract Documents attached hereto without change.

V. CONTRACT REQUIREMENTS

Selected entity(s) will be required to enter into a formal Trade Agreement (including General Conditions, Specifications, and other Contract Documents) with LMDC in the forms issued (or to be issued) as part of this Invitation to Bid, subject to addenda or amendments issued by LMDC.

VI. MISCELLANEOUS CONDITIONS

A. Obligation Only on Formal Trade Agreement

The issuance of this Invitation to Bid and the submission of a response by any candidate entities or the acceptance of such response by LMDC do not obligate LMDC in any manner. Legal obligations will only arise on the execution of the formal Trade Agreement by LMDC and the entity selected by LMDC. Responses to this Invitation to Bid will be prepared at the sole cost and expense of the candidate entities. No materials submitted in response to this Invitation to Bid will be returned.

B. LMDC Reservation of Rights

LMDC may (i) amend, modify, or withdraw this Invitation to Bid, (ii) revise requirements of this Invitation to Bid, (iii) require supplemental statements or information from any entity, (iv) accept or reject any or all responses hereto, (v) extend the deadline for submission of responses thereto, (vi) negotiate or hold discussions with any respondent, (vii) waive defects and allow corrections of deficient responses which do not completely conform to the instructions contained herein, and (viii) cancel this Invitation to Bid, in whole or in part, if LMDC deems it in its best interest to do so. LMDC may exercise the foregoing rights at any time without notice and without liability to any proposing entity or any other party for their expenses incurred in the preparation of the responses hereto or otherwise.

C. Nondiscrimination and Affirmative Action Policies; Opportunity Downtown Plan

It is the policy of LMDC to comply with all federal, state and local laws, policies, orders, rules and regulations which prohibit unlawful discrimination because of race, creed, color, national origin, sex, sexual orientation, age, disability or marital status, and to take affirmative action in working with contracting parties to ensure that Minority and Women-owned Business Enterprises (“M/WBEs”), Minority Group Members and women share in the economic opportunities generated by LMDC’s participation in projects or initiatives, and/or the use of LMDC funds. LMDC is a subsidiary of ESDC and its non-discrimination and affirmative action policy will apply to this Invitation to Bid and any resulting contract(s). LMDC and LMDC have established a 20% M/WBE participation goal for the entire redevelopment project. The selected entity shall be required to use its best efforts to provide for the meaningful participation of

United States M/WBEs, Minority Group Members and women in the execution of this contract. A copy of each responding entity's equal employment opportunity policy statement, Attachment 1 (Workforce Employment Utilization Report) relating to the anticipated workforce to be utilized on the contract and Attachment 2 (MBE/WBE Compliance Report) relating to the anticipated participation as subcontractors of M/WBEs, shall be included as part of the response to the Invitation to Bid. The ESDC Affirmative Action Unit ("AAU") is available to assist you in identifying M/WBEs certified by the State of New York that can provide goods and services in connection with the contract. If you require M/WBE listings, please call the AAU at (212) 803-3224. The selected entity must also participate in LMDC's Opportunity Downtown Plan.

Please refer to Article 20 of the General Conditions and Schedules C and F to the General Conditions for additional requirements relating to the foregoing.

D. Executive Order 127 and State Finance law Sections 139-j and 139-k

Executive Order 127 and State Finance Law Sections 139-j and 139-k (collectively, the "Procurement Requirements") apply to this solicitation. These Procurement Requirements (1) govern permissible communications between potential respondents and LMDC or other involved governmental entities with respect to this solicitation during the procurement process; (2) provide for increased disclosure in the public procurement process through identification of persons or organizations whose function is to influence procurement contracts, public works agreements and real property transactions; and (3) establish sanctions for knowing and willful violations of the provisions of the Procurement Requirements, including disqualification from eligibility for an award of any contract pursuant to this solicitation.

Compliance with the Procurement Requirements requires that (x) all communications regarding this solicitation, from the issuance of this solicitation through final award and approval of any resulting contract (the "Restricted Period"), be conducted only with the contact person(s) listed below; (y) the completion by respondents of the Contractor Disclosure of Contacts Form, the Offerer Disclosure of Prior Non-Responsibility Determinations and the Offerer's Affirmation of Understanding of and Agreement pursuant to State Finance Law, copies of which are attached to this solicitation as part of Attachment 5 and (z) periodic updating of such forms during the term of any contract resulting from this solicitation. Respondents must submit each of these three forms, properly completed, as part of their proposals. The Procurement Requirements also require LMDC employees to obtain and report certain information when contacted by prospective bidders during the Restricted Period, make a determination of the responsibility of bidders and make all such information publicly available in accordance with applicable law. If a prospective bidder is found to have knowingly and willfully violated the State Finance Law provisions, that prospective bidder and its subsidiaries, related or successor entities will be determined to be a non-responsible bidder and will not be awarded any contract issued pursuant to this solicitation. In addition, two such findings of non-responsibility within a four-year period can result in debarment from obtaining any New York State governmental procurement contract.

A copy of LMDC's Policy Regarding Permissible Contacts under State Finance Law Section 139-j and 139-k is attached to this solicitation as Part of Attachment 5. Neither this summary nor the referenced Policy is a complete presentation of the provisions of the Procurement Requirements. A copy of Executive Order 127 can be found at

<http://www.ogs.state.ny.us/aboutogs/regulations/defaultProcurement.html> and State Finance Law Sections 139-j and 139-k can be found at <http://www.ogs.state.ny.us/aboutogs/regulations/advisory Council/StatutoryReferences.html>. All potential Respondents are solely responsible for full compliance with the Procurement Requirements.

ALL QUESTIONS, COMMENTS, REQUESTS FOR CLARIFICATION AND OTHER COMMUNICATIONS REGARDING THIS SOLICITATION MUST BE IN WRITING AND SUBMITTED TO EMILY BROWN AT EBROWN@RENEWNYC.COM. CONTACT WITH ANY OTHER PERSON REGARDING THIS SOLICITATION IS PROHIBITED BY LAW. All questions and requests for clarification will be responded to in writing and disseminated to all persons and organizations having expressed an interest in this solicitation.

E. State Tax Law Section 5-a

Any contract resulting from this solicitation is also subject to the requirements of State Tax Law Section 5-a (“STL 5-a”). STL 5-a prohibits GIPEC from approving any such contract with any entity if that entity or any of its affiliates, subcontractors or affiliates of any subcontractor makes sales within New York State of tangible personal property or taxable services having a value over \$300,000 and is not registered for sales and compensating use tax purposes. To comply with STL 5-a, all respondents to this solicitation must include in their responses a properly completed form ST-220, a copy of which is attached to this solicitation as Attachment 9. Also in accordance with the requirements of STL 5-a, any contract resulting from this solicitation will require periodic updating of the certifications contained in Form ST-220. Solicitation responses that do not include a properly completed ST-220 will be considered incomplete and non-responsive and will not be considered for contract award.

CHECKLIST OF REQUIRED ATTACHMENTS FOR BIDDER TO COMPLETE

Attachment 1	Workforce Employment Utilization Report
Attachment 2	MBE/WBE Compliance Report
Attachment 3	Standard Business Background Questionnaire
Attachment 4	Bid Form
Attachment 5	<ul style="list-style-type: none">•Contractor Disclosure of Contacts Form and the Offerer•Disclosure of Prior Non-Responsibility Determinations Form•Model Language to Obtain Offerer's Affirmation of Understanding of and Agreement pursuant to State Finance Law Section 139-j (3) and Section 139-j (6) (b)•Policy regarding Permissible Contacts under State Finance Law Section 139-j and Section 139-k
Attachment 6	Bid Bond
Attachment 7	Project Approach and Methodology
Attachment 8	OCIP Bid Worksheet – Insurance Cost
Attachment 9	Form ST-220 - Contractor Certification

Workforce Employment Utilization Report

[attached]

Schedule C, Attachment C-1

MONTHLY EMPLOYMENT UTILIZATION REPORT

Construction Contract

(See next page for instructions)

COMPANY NAME: ADDRESS: TELEPHONE NUMBER: FEDERAL ID NO.: CHECK IF NOT-FOR-PROFIT:	PROJECT NAME: PROJECT LOCATION: COUNTY: _____ ZIP: _____ REPORTING PERIOD: Month _____ Year _____	CONTRACTOR START DATE: _____ ESTIMATED COMPLETION DATE: _____ PERCENT OF JOB COMPLETED (for reporting period): _____ CONTRACT NO.: _____ CONTRACT AMOUNT: \$ _____	COMPANY EMPLOYMENT DATA															
			A. TOTAL COMPANY EMPLOYEES (at the Beginning of project) <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width:50%;">Male</td> <td style="width:50%;">Female</td> </tr> </table>	Male	Female	B. TOTAL COMPANY EMPLOYEES (at the end of project) <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width:50%;">Male</td> <td style="width:50%;">Female</td> </tr> </table>	Male	Female	C. NET INCREASE (applies only to changes, if any, in Company's Employee makeup at the end of project) <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th colspan="2">TOTAL MALE</th> <th colspan="2">TOTAL FEMALE</th> </tr> <tr> <td>C1. EMPLOYEES</td> <td>C2. OCCUPATIONAL CODES/# OF EMPLOYEES</td> <td>C3. EMPLOYEES</td> <td>C4. OCCUPATIONAL CODES OF EMPLOYEES</td> </tr> </table>		TOTAL MALE		TOTAL FEMALE		C1. EMPLOYEES	C2. OCCUPATIONAL CODES/# OF EMPLOYEES	C3. EMPLOYEES	C4. OCCUPATIONAL CODES OF EMPLOYEES
Male	Female																	
Male	Female																	
TOTAL MALE		TOTAL FEMALE																
C1. EMPLOYEES	C2. OCCUPATIONAL CODES/# OF EMPLOYEES	C3. EMPLOYEES	C4. OCCUPATIONAL CODES OF EMPLOYEES															

CLASSIFICATION	1. WORKER HOURS OF EMPLOYMENT										2. NUMBER OF WORKERS				3. CONSTRUCTION TRADES	TOTAL WHITE	TOTAL BLACK	TOTAL HISPANIC	TOTAL ASIAN	
	1a. ALL WORKER HOURS			1b. BLACK (Not of Hispanic Origin)		1c. HISPANIC		1d. ASIAN or PACIFIC ISLANDER		1e. NATIVE AMERICAN/ ALASKAN NATIVE		2a. ALL		2b. MINORITY						
	MALE	FEMALE	TOTAL	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE	MALE						FEMALE
Supervisory																				
Journey Worker																				
Apprentice																				
Trainee																				
Subtotal																				
Journey Worker																				
Apprentice																				
Trainee																				
Subtotal																				
Journey Worker																				
Apprentice																				
Trainee																				

Trees for WTC Memorial

COMPANY NAME: ADDRESS: TELEPHONE NUMBER: FEDERAL ID NO.: CHECK IF NOT-FOR-PROFIT:	PROJECT NAME: PROJECT LOCATION: COUNTY: _____ ZIP: _____ REPORTING PERIOD: Month Year	CONTRACTOR START DATE: _____ ESTIMATED COMPLETION DATE: PERCENT OF JOB COMPLETED (for reporting period): CONTRACT NO.: CONTRACT AMOUNT: \$ _____	COMPANY EMPLOYMENT DATA																	
			A. TOTAL COMPANY EMPLOYEES <i>for the</i> <i>Beginning of project</i> Male Female	B. TOTAL COMPANY EMPLOYEES <i>for</i> <i>the end of project</i> Male Female	C. NET INCREASE <i>(applies only to changes, if any, in Company's Employee makeup at the end of project)</i> <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td colspan="2" style="text-align: center;">TOTAL MALE</td> <td colspan="2" style="text-align: center;">TOTAL FEMALE</td> </tr> <tr> <td style="text-align: center;">C1. EMPLOY- EES</td> <td style="text-align: center;">C2. OCCUPA- TIONAL CODES/ OF EMPLOYEES</td> <td style="text-align: center;">C3. EMPLOY- EES</td> <td style="text-align: center;">C4. OCCUPA- TIONAL CODES/ OF EMPLOYEES</td> </tr> <tr> <td colspan="2" style="text-align: center;">TOTAL NATIVE AMERICAN</td> <td colspan="2" style="text-align: center;">TOTAL NATIVE AMERICAN</td> </tr> </table>				TOTAL MALE		TOTAL FEMALE		C1. EMPLOY- EES	C2. OCCUPA- TIONAL CODES/ OF EMPLOYEES	C3. EMPLOY- EES	C4. OCCUPA- TIONAL CODES/ OF EMPLOYEES	TOTAL NATIVE AMERICAN		TOTAL NATIVE AMERICAN	
TOTAL MALE		TOTAL FEMALE																		
C1. EMPLOY- EES	C2. OCCUPA- TIONAL CODES/ OF EMPLOYEES	C3. EMPLOY- EES	C4. OCCUPA- TIONAL CODES/ OF EMPLOYEES																	
TOTAL NATIVE AMERICAN		TOTAL NATIVE AMERICAN																		
Subtotal																				
TOTAL SUPERVISORS																				
TOTAL JOURNEY WORKERS																				
TOTAL APPRENTICES																				
TOTAL TRAINEES																				
GRAND TOTAL																				

CERTIFICATION: I, _____ (Print Name), the _____ (Title), do certify that (i) I have read this Monthly Employment Utilization Report and (ii) to the best of my knowledge, information and belief the information contained herein is complete and accurate.

SIGNATURE _____ DATE _____

MONTHLY EMPLOYMENT UTILIZATION REPORT

Instructions for Completion

The Monthly Employment Utilization Report ("MEUR") is to be completed by each subject contractor (both Prime and Sub) and signed by a responsible official of the company. The reports are to be filed by the 5th day of each month during the term of the project, and they shall include the total work-hours for each employee classification in each trade in the covered area for the monthly reporting period. The prime contractor is responsible for submitting its subcontractors report, along with its own. Additional copies of this form may be obtained from Lower Manhattan Development Corp. ("LMDC").

Minority: Includes Blacks, Hispanics, Native Americans, Alaskan Natives, and Asian and Pacific Islanders, both men and women.

1. ***Worker Hours of Employment (a-e):***
 - a) ***All Worker Hours:*** The total number of male hours, the total number of female hours, and the total of both male and female hours worked under each classification.
 - b) through e) ***Minority Worker Hours*** The total number of male hours and the total number of female hours worked by each specified group of minority worker in each classification.
2. ***Number of Workers (a-b):***
 - a) ***All Workers*** Total number of males and total number of females working in each classification of each trade in the contractor's aggregate workforce during reporting period.
 - b) ***Minority Workers*** Total number of male minorities and total number of female minorities working in each classification, in each trade in the contractor's aggregate workforce during reporting period.
3. ***Construction Trade:*** Only those construction crafts which contractor employs in the covered area.
Construction Trades include: Field Office Staff (Professionals and Office/Clerical), Laborers, Equipment Operators, Surveyors, Truck Drivers, Iron Workers, Carpenters, Cement Masons, Painters, Electricians, Plumbers and Other.

Note: LMDC may demand payroll records to substantiate work hours listed on the Monthly Employment Utilization Report, if discrepancies should arise.

OCCUPATIONAL CODES

Officials/Administrators	100
Professionals	110
Technicians	120
Sales Workers	130
Office & Clerical	140
Craft Workers	150
Operatives	160
Laborers	170
Service Workers	180

Trees for WTC Memorial

MBE/WBE Compliance Report

[attached]

SCHEDULE C, Attachment C-2

MBE/WBE COMPLIANCE REPORT

CONSTRUCTION

(to be filed monthly)

PROJECT SPONSOR/DEVELOPER: _____

ADDRESS: _____

TELEPHONE: _____

CONTACT PERSON: _____

AA REPRESENTATIVE: _____

PROJECT NAME: _____

PROJECT START DATE: _____ PERCENT COMPLETE: _____

ACTUAL COMPLETION: _____

Attach M/WBE contract documentation, i.e. executed contracts, signed purchase orders or canceled checks. This report should be completed by an officer of the reporting company, and forwarded to the LWDC with the appropriate documentation.

PRIME CONTRACTOR (Name, Address, Contact Person and Phone)	TYPE OF CONTRACT (Trade/Service)	CONTRACT AMOUNT	SUB CONTRACTOR NO. & AMT.	MBE/WBE SUBCONTRACTOR (Name, Address, Contact Person and Phone)	SCOPE OF SERVICES	AMOUNT CONTRACTED TO MBE/WBE

CERTIFICATION:

I, _____ (Print Name), the _____ (Title), do certify that (D) I have read this Compliance Report and (E) to the best of my knowledge, information and belief the information contained herein is complete and accurate.

SIGNATURE _____ DATE _____

Trees for WTC Memorial

Standard Background Questionnaire

[attached]



STANDARD BUSINESS BACKGROUND QUESTIONNAIRE

INSTRUCTIONS

- This Questionnaire shall be completed on behalf of the Entity by an individual who is knowledgeable about the past and present operations of the entity and its policies.
Entities intending to bid as joint venturers should submit a separate Questionnaire for each joint venturer.
Whenever more space is needed to answer any question, or you wish to give further explanation, complete by attaching extra pages.
All questions must be answered. If a particular question does not apply, the response must state "Not Applicable" ("NA").
Any suits, liens, judgments, litigation, violations, and administrative or court actions under appeal must be disclosed.

NOTE: Please indicate whether you believe that any of the information supplied herein is confidential and should be exempt from disclosure under the New York Freedom of Information Law: yes, no. If you checked "yes" you must identify the information you feel is confidential by placing an asterisk in front of the appropriate question number(s) and attach an additional sheet(s) explaining the basis for such claim(s).

DEFINITIONS

For purposes of this Questionnaire, the following terms shall have the following meanings:

- A. "Affiliate" shall mean any person or entity that is directly or indirectly controlled by the person or entity to which the question relates, or any person or entity that directly or indirectly controls such person or entity. For purposes of this definition, control means the power to direct the management of the entity, person or other entity, whether through ownership of shares, the right to designate the Board of Directors, contract or otherwise.
B. "Principal" shall mean any person who is or has been, within the past five (5) years, either an owner of five percent (5%) or more of the entity's shares, one of the entity's five (5) largest shareholders or a director, officer, partner or proprietor of the Entity.
C. "Key Person" shall mean any individual, not identified in this Questionnaire as a Principal, who participates in policy making, financial decisions, or the Entity's operations in relation to the project.

GENERAL INFORMATION

1. LEGAL NAME OF ENTITY (hereafter, the "Entity")
EMPLOYER IDENTIFICATION NUMBER
DBA NAME, IF ANY
MAILING ADDRESS PHONE NO. ()
CITY COUNTY STATE ZIP FAX NO. ()
ACTUAL LOCATION
ENTITY HEADQUARTERS (if different)

Trees for WTC Memorial

E-MAIL ADDRESS _____ WEB SITE _____

2. CONTACT NAME FOR QUESTIONNAIRE _____ TITLE _____ PHONE NO. _____
3. TYPE OF ENTITY (check only one) CORPORATION PARTNERSHIP PROPRIETORSHIP JOINT VENTURE LLC LLP
4. HOW MANY YEARS HAS THE ENTITY BEEN IN BUSINESS? _____ UNDER THE SAME NAME? _____ FORMER NAME(S): _____
- 4a. WAS THE ENTITY PURCHASED AS AN EXISTING BUSINESS BY ITS PRESENT OWNER(S) NO YES (IF YES PROVIDE INFORMATION)
DATE PURCHASED ___/___/___ PREVIOUS OWNER(S) NAME(S): _____
5. WHAT IS THE ENTITY'S BONDING RANGE? \$ _____ SINGLE PROJECT \$ _____ AGGREGATE (ALL PROJECTS)
6. ARE YOU CERTIFIED MBE _____ WBE _____ IF SO, BY WHOM? _____

OWNERSHIP, MANAGEMENT, AFFILIATION

7. **Principals:** Identify each person who is, or has been within the past five (5) years, an owner of five percent (5.0%) or more of the Entity's shares, or one of the five (5) largest shareholders or a director, an officer, a partner or a proprietor. Fill in name, % owned, office held and indicate by Y or N whether the individual is a director, officer, partner or Key Person:

FIRST NAME	MI	LAST NAME	DATE OF BIRTH	% OWNED	DIRECTOR (Y OR N)	OFFICER (Y OR N)	TITLE	PARTNER (Y OR N)	KEY PERSON (Y OR N)

8. **Key Persons:** Identify any individual, not listed in your answers to question 7 and identified as a Principal, who participates in policy making, financial decisions or the Entity's operations in relation to the project:

FIRST NAME	MI	LAST NAME	DATE OF BIRTH	TITLE

Trees for WTC Memorial

9. **Ownership of Other Entities:** Identify any other entities in which, now or in the past five (5) years, the Entity or any Principals or Key Persons, either owned or owns five percent (5.0%) or more of the shares of, or was or is one of the five (5) largest shareholders, a director, officer, partner or proprietor of such other entity:

FEDERAL ID NO.	% OWNED	ENTITY/COMPANY NAME	ENTITY/COMPANY ADDRESS

10. **Affiliates:** Identify any Affiliate not listed in your answers to question 9.

FEDERAL ID NO.	COMPANY NAME	ADDRESS

11. Identify the name and types of any professional or occupational license(s) (e.g., attorney, CPA, architect, engineer, securities, insurance, etc.) ever held by the Entity, Principal or Key Person and provide the information below.

TYPE OF LICENSE	LICENSING AUTHORITY	INDIVIDUAL NAMED ON LICENSE	LICENSE NUMBER	DATE HELD FROM (MO/YR TO MO/YR)

Trees for WTC Memorial

12. Are any persons identified in your answers to questions 7, 8, or 10:

- (a) Present or past employees of LMDC or LMDC No ____ Yes ____
- (b) Related by kinship or marriages to any present or past employees of LMDC or LMDC? No ____ Yes ____

If you answered "yes" to questions 12(a) or 12(b), provide name(s) of such individual(s) and indicate his or her relationship to the current/former Foundation/LMDC employee.

F. FINANCIAL INFORMATION

13. Attach a copy of the Entity's most recent audited annual financial statement, include (if any) the auditor's report and accompanying footnotes.

14. For the purpose of this contract, is any other person or entity guaranteeing the performance of, or otherwise providing financial assistance to, your Entity? If so, describe the form of assistance and list the name(s) and federal tax identification number(s) ("TIN") of each person or entity:

FORM OF ASSISTANCE	INDIVIDUAL	COMPANY NAME	FEDERAL TIN	ADDRESS

OTHER INFORMATION

15. For the Entity or any individual, entity or Affiliate identified in questions 7 through 10 above; (a) list and describe all judgments, liens or claims over \$25,000 filed against the Entity, individual, entity or Affiliate and remaining undischarged or unsatisfied for more than ninety (90) days; and (b) list and describe all liquidated damages assessed. Also list any litigation currently pending against the Entity, individual, entity, or Affiliate, if the judgment sought relates to the type of work to be performed for LMDC, or could have a material adverse financial impact on the Entity, individual, entity or Affiliate.

INDIVIDUAL, ENTITY OR AFFILIATE	LIENS, CLAIMS, LITIGATION INDEX/DOCKET NO.	LIQUIDATED DAMAGES

16. Within the past five (5) years has the Entity, Principal, Key Person, or Affiliate been the subject of any of the following (respond to each question and describe in detail the circumstances of each affirmative answer; attach additional pages if necessary):

- (a) a judgment of conviction for any business-related conduct constituting a crime under state or Federal law? No _____ Yes _____

- (b) a criminal investigation or indictment for any business-related conduct constituting a crime under state or Federal law? No _____ Yes _____

- (c) a grant of immunity for any business-related conduct constituting a crime under state or Federal law? No _____ Yes _____

- (d) any felony or misdemeanor charges pending that were filed either before or during their employment or affiliation with the Entity? No _____ Yes _____

- (e) a Federal or state suspension or debarment? No _____ Yes _____

- (f) a finding of non-responsibility by any government agency? No _____ Yes _____

- (g) a denial or revocation of prequalification? No _____ Yes _____

Trees for WTC Memorial

- (h) a voluntary exclusion from bidding/contracting agreement? No _____ Yes _____
- (i) any administrative or civil action seeking specific performance or restitution on any public works contract except any disputed work proceeding? No _____ Yes _____
- (j) an OSHA Citation and Notification of Penalty containing a violation classified as serious? No _____ Yes _____
- (k) an OSHA Citation and Notification of Penalty containing a violation classified as willful? No _____ Yes _____
- (l) a prevailing wage or supplement payment violation? No _____ Yes _____
- (m) a state labor law violation deemed willful? No _____ Yes _____
- (n) any other federal or state citations, notices, violation orders, pending administrative hearings or proceedings or determinations of a violation of any labor law or regulation? No _____ Yes _____
- (o) any criminal investigation, felony indictment or conviction concerning formation of, or any business association with, any allegedly false or fraudulent women's, minority or disadvantaged business enterprise? No _____ Yes _____
- (p) any denial, decertification, revocation or forfeiture of Women's Business Enterprise, Minority Business Enterprise or Disadvantaged Business Enterprise status? No _____ Yes _____
- (q) rejection of a low bid on a local, state or federal contract for failure to meet statutory affirmative action or M/WBE requirements? No _____ Yes _____
- (r) consent order with the NYS Department of Environmental Conservation, or a federal, state or local government enforcement determination involving a violation of federal or state environmental laws? No _____ Yes _____
- (s) any citations, notices, violation orders, pending administrative hearings or proceedings or determinations for violations of:
- Federal, state or local health laws, rules or regulations? No _____ Yes _____
 - Federal, state or local environmental laws, rules or regulations? No _____ Yes _____
 - unemployment insurance or workers compensation coverage or claim requirements? No _____ Yes _____
 - ERISA (Employee Retirement Income Security Act)? No _____ Yes _____

Trees for WTC Memorial

- Federal, state or local human rights laws? No _____ Yes _____
- Federal or state security laws? No _____ Yes _____
- a request to withdraw a bid submitted to a public owner or any claim of an error on a bid submitted to a public owner? No _____ Yes _____
- (t) any bankruptcy or reorganization proceeding? No _____ Yes _____
- (u) any suspension or revocation of any business or professional license, certificates or certifications? No _____ Yes _____
- (v) a denial of an application for a professional or trade license? No _____ Yes _____

17. Within the past five (5) years has the Entity, Principal, or Key Person (respond to each question and detail the circumstances of each affirmative answer; attach additional pages if necessary):

- (a) filed or submitted to any government agency, employee or representative any document that the Entity, Affiliate, Principal or Key Person knew to contain a false statement or false information? No__ Yes__
- (b) falsified any business record? No__ Yes__
- (c) given or offered to give money or any thing of value or any benefit to any labor official or public servant with intent to influence that person with respect to his or her official acts, duties or decisions as a labor official or public servant? No__ Yes__
- (d) given or offered to give money or any thing of value or any benefit to any official or employee of a business with intent to induce that person or employee to engage in unethical or illegal business practices? No__ Yes__
- (e) agreed with any person to submit a proposal, price or bid below prevailing market rate? No__ Yes__
- (f) been sued or paid a settlement of claim related to the performance of professional services? No__ Yes__

18. Within the past five (5) years, has the Entity ever:

- (a) failed to file any required tax returns or failed to pay any applicable Federal, state or New York City taxes, or other assessed New York City charges including, but not limited to, water and sewer charges? No__ Yes__
- (b) had, or does it presently have, any delinquent Federal, state or New York City taxes outstanding? No__ Yes__

If you answered "yes" to questions 18(a) or 18(b), supply details.

19. Provide any supplemental information the Entity desires to have considered as part of its response to this Questionnaire.

CERTIFICATION

The undersigned recognizes that this Questionnaire is submitted for the express purpose of inducing LMDC to award a contract or approve a subcontract; acknowledges that LMDC may in its discretion, by means which it may choose, determine the truth and accuracy of all statements made herein; authorizes LMDC, the United States Department of Housing and Urban Development, or their agents to contact any entity named in this Questionnaire and any attachments for the purposes of verifying the information supplied; acknowledges that the intentional submission of false or misleading information may constitute a felony under New York Penal Law Section 210.40 or a misdemeanor under Penal Law Section 210.35 or Section 210.45, and may also be punishable by a fine of up to \$10,000 or imprisonment of up to five years under 18 U.S.C. Section 1001; represents that the information submitted in this Questionnaire and any attached pages is true, accurate and complete, and agrees to notify LMDC in writing of any change in circumstances occurring after the submission of this questionnaire and during the performance of any contract awarded.

Sworn to before me this _____ day of _____, _____.

Signature of Officer

Notary Public

Title

Commission Expiration Date

Bid Form

[attached]

**BID FORM FOR
WORLD TRADE CENTER MEMORIAL
TREE ACQUISITION, INSTALLATION AND MAINTENANCE
PROJECT #**

Bid of _____ (hereinafter "BIDDER")
a

corporation organized under the laws of the State _____.

Submitted to Lower Manhattan Development Corporation (hereinafter "LMDC" or "Owner").

I. The undersigned BIDDER proposes and agrees, if this bid (the "Bid") is accepted to enter into an agreement with LMDC in the form included in the Contract Documents (as defined in the form of Trade Agreement attached to the Invitation to Bid) to perform and furnish all Work as specified or indicated in the Contract Documents for the Bid amount and within the times and otherwise in accordance with the other terms and conditions of the Contract Documents.

II. BIDDER accepts all of the terms and conditions of the Invitation to Bid dated May 8, 2006 provided in connection with the Project (the "Invitation to Bid") and Instructions to Bidders, including without limitation those dealing with the disposition of Bid security. This Bid will remain subject to acceptance for one hundred twenty days after the day of Bid opening. BIDDER will sign and deliver the required number of counterparts of the Trade Agreement with the Bonds and other documents as required by the Invitation to Bid.

(A) BIDDER has examined and carefully studied the Invitation to Bid and Contract Documents and the following Addenda, receipt of which is hereby acknowledged: (List Addenda by Addendum Number and Date):

(B) BIDDER has attended the mandatory pre-bid conference and become familiar with and is satisfied as to the general, local and site conditions that may affect cost, progress, performance and furnishing of the Work;

(C) BIDDER is familiar with and is satisfied as to all Legal Requirements that may affect cost, progress, performance and furnishing of the Work.

(D) BIDDER is aware of the general nature of the Work to be performed by the Owner, and other contractors at the site that relates to Work for which this Bid is submitted as indicated in the Contract Documents.

- (E) BIDDER has correlated the information known to BIDDER, information and observations obtained from visits to the site, reports and drawings identified in the Contract Documents and all additional examinations, investigations, explorations, tests, studies and data with the Contract Documents.
- (F) BIDDER has given Owner written notice of all conflicts, errors, ambiguities or discrepancies that BIDDER has discovered in the Contract Documents and the written resolution thereof by Owner is acceptable to BIDDER, and the Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performing and furnishing the Work for which this Bid is submitted.
- (G) This Bid is genuine and not made in the interest of or on behalf of any undisclosed person, entity or corporation and is not submitted in conformity with any agreement or rules of any group association, organization or corporation; BIDDER has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid; BIDDER has not solicited or induced any person, entity or corporation to refrain from bidding; and BIDDER has not sought by collusion to obtain for itself any advantage over any other Bidder or over Owner.
- (H) Words and phrases as defined in the Contract Documents have the same meaning in this Bid Form.
- (I) This Bid Form will become part of the Contract Documents if LMDC enters into the Contract with this Bidder.

III. BIDDER will complete the Work in accordance with the Contract Documents for the following amounts:

- 1) **Bonds and Insurance** \$ _____
- 2) **Submittals** \$ _____
- 3) **Selection, tagging, and acquisition of All Trees.** \$ _____
- 4) **Spading, Transporting to Holding Facility, and Boxing of ALL Trees**
(Including Fifty Four (54) Overstock Swamp White Oaks, Ten (10) Overstock Sweet Gums, and Five (5) LMDC supplied Sweet Gums) \$ _____
- 5) **Maintain ALL Trees at Holding Facility**
(Including Fifty Four (54) Overstock Swamp White Oaks, Ten (10) Overstock Sweet Gums, and Five (5) LMDC supplied Sweet Gums) \$ _____
- 6) **Transport and Installation of Trees to WTC Project Site**
 - a) Zone 1: Memorial Plaza
 - 1. Two Hundred Thirty Nine (239) Swamp White Oaks \$ _____
 - 2. Thirty Nine (39) Sweet Gums (contractor provided) \$ _____
 - 3. Five (5) Sweet Gums (LMDC supplied) \$ _____
 - b) Zone 2: West Street
 - 1. Thirty Three (33) Swamp White Oaks \$ _____
 - c) Zone 3: Liberty, Fulton, and Greenwich Streets
 - 1. Fifty One (51) Swamp White Oaks \$ _____
 - d) Zone 4: Visitor Center Plaza
 - 1. Thirty Four (34) Swamp White Oaks \$ _____
- 7) **Post Installation Maintenance of Trees**
 - a) Zone 1 \$ _____
 - b) Zone 2 \$ _____
 - c) Zone 3 \$ _____
 - d) Zone 4 \$ _____
- 8) **Contingency Allowance** \$ 500,000.00
- 9) **GRAND TOTAL (Sum of 1-6 from above)** \$ _____

Dollars

Grand Total Amount Written in Words
Includes all Items above

ALTERNATES

Trees for WTC Memorial
Attachment 4: Bid Form

Bid Form
Page 3

Part 1 – General

1.1 SUMMARY

A. This Section includes administrative and procedural requirements for Alternates.

1.2 DEFINITIONS

A. Alternate: An amount proposed by the bidder and stated on the Bid Form for certain Work defined in the Contract Documents that may be added to or deducted from the Lump Sum amount if Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.

1. The cost or credit for each Alternate is the net addition to or deduction from the Lump Sum to incorporate such Alternate in the Work. No other adjustments are made to the Lump Sum.

1.3 PROCEDURES

A. Include as part of each Alternate, miscellaneous devices, accessory object, and similar items incidental to or required for a complete installation whether or not indicated as part of such Alternate.

B. Add or Deduct Alternates may be designated by LMDC within 30 days after signing of the Contract. Immediately following award of the Contract, Bidder shall notify each party involved, in writing, of the status of each Alternate. Indicate if Alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated modifications to Alternates.

C. Execute accepted Alternates under the same conditions as other Work of the Contract (i.e. selected Alternates will be added to or deducted from the Lump Sum).

D. A Schedule of Alternates is included below:

1. **Deduct Alternate No. 1** – For all phases, replace all large 6-7” caliper Swamp White Oaks with 4-5” caliper Swamp White Oaks (size is at time of tagging).

_____ Dollars \$(_____)
Total Amount Written in Words

2. **Deduct Alternate No. 2** – Replace all large 6.5-7” caliper Sweet Gums with 4.5-5” caliper Sweet Gums (size is at time of tagging).

_____ Dollars \$(_____)
Total Amount Written in Words

3. **Deduct Alternate No. 3** – Provide One (1) year Maintenance and Guarantee on all Trees in lieu of Two (2) year Maintenance and Guarantee period.

_____ Dollars \$(_____)
Total Amount Written in Words

4. **Add Alternate No. 4** – Add Price for obtaining Builder’s Risk Insurance as described in General Conditions Schedule “G”, Parts One and Two.

_____ Dollars \$(_____)
 Total Amount Written in Words

UNIT COST BID AMOUNTS (Do not include in totals above)

These bid unit costs will be used in the event work is added or deleted and includes all labor, supervision, management, material, equipment, incidental work and all mark-ups necessary to fully execute the stated work to its completion. The Owner reserves the right to reject or negotiate any unit price. Contractor is responsible for submission of fair market unit prices for all items. Unit prices shall be valid until project completion.

- 1. Selection, tagging and acquisition of Swamp White Oak trees, excluding transport, boxing, maintenance, and installation. \$ _____ / Tree
- 2. Selection, tagging and acquisition of Liquidambar trees, excluding transport, boxing, maintenance, and installation.
- 3. Transport to WTC Project Site Swamp White Oak – Zone 1 \$ _____ / Tree
- 4. Transport to WTC Project Site Swamp White Oak – Zone 2 \$ _____ / Tree
- 5. Transport to WTC Project Site Swamp White Oak – Zone 3 \$ _____ / Tree
- 6. Transport to WTC Project Site Swamp White Oak – Zone 4 \$ _____ / Tree
- 7. Transport to WTC Project Site Liquidambar – Zone 1 \$ _____ / Tree
- 8. Installation only at WTC Project Site Swamp White Oak – Zone 1 \$ _____ / Tree
- 9. Installation only at WTC Project Site Swamp White Oak – Zone 2 \$ _____ / Tree
- 10. Installation only at WTC Project Site Swamp White Oak – Zone 3 \$ _____ / Tree
- 11. Installation only at WTC Project Site Swamp White Oak – Zone 4 \$ _____ / Tree
- 12. Installation only at WTC Project Site Liquidambar – Zone 1 \$ _____ / Tree
- 13. Pre-Installation Maintenance at Holding Facility, including boxing and initial transport to Holding Facility – Swamp White Oak Zone 1 \$ _____ / Tree
- 14. Pre-Installation Maintenance at Holding Facility, including boxing and initial transport to Holding Facility – Swamp White Oak Zone 2 \$ _____ / Tree
- 15. Pre-Installation Maintenance at Holding Facility, including boxing and initial transport to Holding Facility – Swamp White Oak Zone 3 \$ _____ / Tree
- 16. Pre-Installation Maintenance at Holding Facility, including boxing and initial transport to Holding Facility – Swamp White Oak Zone 4 \$ _____ / Tree

17. Pre-Installation Maintenance at Holding Facility, including boxing and initial transport to Holding Facility – Liquidambar Zone 1 \$ _____ / Tree
18. 2-Year Maintenance at WTC Project Site – Swamp White Oak Zone 1 \$ _____ / Tree
19. 2-Year Maintenance at WTC Project Site – Swamp White Oak Zone 2 \$ _____ / Tree
20. 2-Year Maintenance at WTC Project Site – Swamp White Oak Zone 3 \$ _____ / Tree
21. 2-Year Maintenance at WTC Project Site – Swamp White Oak Zone 4 \$ _____ / Tree
22. 2-Year Maintenance at WTC Project Site – Liquidambar Zone 1 \$ _____ / Tree
23. Extend Tree Installation date at WTC Project Site, including additional pre-installation maintenance at Tree Holding Facility and 2-Year Maintenance per planting season (Fall/Spring). Maximum 18-Months Extension. Swamp White Oak Zone 1 \$ _____ / Tree
24. Extend Tree Installation date at WTC Project Site, including additional pre-installation maintenance at Tree Holding Facility and 2-Year Maintenance per planting season (Fall/Spring). Maximum 18-Months Extension. Swamp White Oak Zone 2 \$ _____ / Tree
25. Extend Tree Installation date at WTC Project Site, including additional pre-installation maintenance at Tree Holding Facility and 2-Year Maintenance per planting season (Fall/Spring). Maximum 18-Months Extension. Swamp White Oak Zone 3 \$ _____ / Tree
26. Extend Tree Installation date at WTC Project Site, including additional pre-installation maintenance at Tree Holding Facility and 2-Year Maintenance per planting season (Fall/Spring). Maximum 18-Months Extension. Swamp White Oak Zone 4 \$ _____ / Tree
27. Extend Tree Installation date at WTC Project Site, including additional pre-installation maintenance at Tree Holding Facility and 2-Year Maintenance per planting season (Fall/Spring). Maximum 18-Months Extension. Liquidambar Zone 1 \$ _____ / Tree
28. Monthly maintenance at Tree Holding Facility – Swamp White Oak. (Maximum additional 18 Months beyond scheduled installation date) \$ _____ / Tree
29. Monthly maintenance at Tree Holding Facility – Liquidambar (Maximum additional 18 Months beyond scheduled installation date) \$ _____ / Tree
30. Application of Imidacloprid Soil Drench – Swamp White Oak \$ _____ / Each
31. Application of Imidacloprid Soil Drench – Liquidambar \$ _____ / Each
32. Application of Anti-desiccant – Swamp White Oak \$ _____ / Each

- 33. Application of Anti-desiccant – Liquidambar \$ _____ / Each
- 34. Application of Horticultural Oil – Swamp White Oak \$ _____ / Each
- 35. Application of Horticultural Oil – Liquidambar \$ _____ / Each
- 36. Application of Fungicide – Swamp White Oak \$ _____ / Each
- 37. Application of Fungicide – Liquidambar \$ _____ / Each
- 38. Application of Miticide – Swamp White Oak \$ _____ / Each
- 39. Application of Miticide – Liquidambar \$ _____ / Each
- 40. Application of Insecticide (general foliar spray) – Swamp White Oak \$ _____ / Each
- 41. Application of Insecticide (general foliar spray) – Liquidambar \$ _____ / Each
- 42. Application of Insecticide (contact for scale) – Swamp White Oak \$ _____ / Each
- 43. Application of Insecticide (contact for scale) – Liquidambar \$ _____ / Each
- 44. Application of Herbicide on Ground at place of growth, prior to boxing –
Swamp White Oak \$ _____ / Each
- 45. Application of Herbicide on Ground at place of growth, prior to boxing –
Liquidambar \$ _____ / Each
- 46. Application of Herbicide on Surface of Backfill Mix and Root Balls in Boxes –
Swamp White Oak \$ _____ / Each
- 47. Application of Herbicide on Surface of Backfill Mix and Root Balls in Boxes –
Liquidambar \$ _____ / Each
- 48. Application of N-P-K plus Micronutrients – Swamp White Oak \$ _____ / Each
- 49. Application of N-P-K plus Micronutrients – Liquidambar \$ _____ / Each
- 50. Application of Mycorrhizae – Swamp White Oak \$ _____ / Each
- 51. Application of Mycorrhizae – Liquidambar \$ _____ / Each
- 52. Application of Biostimulant – Swamp White Oak \$ _____ / Each
- 53. Application of Biostimulant – Liquidambar \$ _____ / Each

IV. The Contractor shall identify below the applicable subcontractors, consultants, etc. All listed entities are subject to LMDC's approval.

SUBCONTRACTORS, CONSULTANTS, ETC., INCLUDING M/W BE

WORK ITEM	SUBCONTRACTOR'S NAME
_____	_____
_____	_____
_____	_____

- V. BIDDER accepts the provisions of the Contract including all terms and conditions in the event of failure to complete the Work within the times specified.
- VI. Communications concerning this Bid shall be addressed to:

Emily Brown
Project Manager, Memorial Cultural Civic Development
Lower Manhattan Development Corporation
1 Liberty Plaza, 20th Floor
New York, NY 10006
ebrown@renewnyc.com
Fax: (212) 962-2431

VII. PRICE GUARANTEE

The prices stated in this proposal are guaranteed for 120 (one hundred twenty) days from the bid due time, and if authorized to proceed within that period, we will agree to complete the Work covered by this proposal at said prices.

In the event of a conflict in the grand total between the written amount and the numerical amount, the actual total of the individual bid items shall take precedence.

Submitted on _____, 2006.

Name of Bidder: _____ (SEAL)

By: _____

Signature

Name and Title: _____

Contractor's License No.: _____

Contractor's Federal ID No.: _____

Telephone No. _____

Fax No. _____

Dunn and Bradstreet No. _____

- Contractor Disclosure Contacts Form and the Contractor Disclosure of Prior Non-Responsibility Determinations Form
- Model Language to Obtain Offerer's Affirmation of Understanding of and Agreement pursuant to State Finance Law Section 139-j (3) and 139-j (6) (b)
- Policy regarding Permissible Contacts under State Finance Law section 139-j and 139-k

[Attached]

COMPLIANCE WITH EXECUTIVE ORDER 127

New York State Executive Order Number 127 (EO 127) provides for increased disclosure in the public procurement process through identification of persons or organizations whose function is to influence procurement contracts, public works agreements and real property transactions.

A procurement is any contract, agreement or subsequent amendment involving an annualized expenditure in excess of \$15,000.00, but does not include those contracts that by law must be awarded to the lowest responsible bidder or based on the lowest price.

ESDC is obligated to obtain identifying information on every person or organization retained, employed or designated by or on behalf of the contractor to attempt to influence the procurement process. ESDC is obligated to collect information on whether such person or organization has a financial interest in the procurement. This obligation is on-going, and survives the awarding of the contract.

In addition, EO 127 mandates consideration of whether a contractor has intentionally provided false or incomplete information under such Order within the last five years, and whether a contractor has failed to timely disclose accurate and complete information or otherwise cooperate in the implementation of the Order. ESDC is precluded from awarding a procurement contract to a contractor with a finding of non-responsibility under the Order unless it makes a finding, on the record, that such contract is in the best interests of the State, notwithstanding the prior finding of non-responsibility.

Attachments

Contractor Disclosure of Contracts Form

Contractor Disclosure of Contacts Form

This form shall be completed and submitted with your bid/proposal or offer in accordance with Executive Order 127 (EO 127). Failure to complete and submit this form shall result in a determination of non-responsiveness and disqualification of the bid, proposal or offer. If at the time of submission of this form, the specific name of a person authorized to attempt to influence a decision on your behalf is unknown, you agree to provide the specific person's information when it is available. You also agree to update this information during the negotiation or evaluation process of this procurement, and throughout the term of any contract awarded to your company pursuant to this bid/proposal or offer.

Name of Contractor: _____

Address: _____

Name and Title of Person Submitting this Form: _____

Is this an initial filing in accordance with Section II, paragraph 1 of EO 127 or an updated filing in accordance with Section II, paragraph 2 of EO 127? (Please circle):

Initial filing

Updated filing

The following person or organization was retained, employed or designated by or on behalf of the Contractor to attempt to influence the procurement process:

Name: _____

Address: _____

Telephone Number: _____

Place of Principal Employment: _____

Occupation: _____

Does the above named person or organization have a financial interest in the procurement?

(Please circle)

yes

no

Model Language to Obtain Offerer's Affirmation of Understanding of and Agreement pursuant to State Finance Law § 139-j (3) and § 139-j (6) (b)

Background:

State Finance Law § 139-j(6)(b) provides that:

Every Governmental Entity shall seek written affirmations from all Offerers as to the Offerer's understanding of and agreement to comply with the Governmental Entity's procedures relating to permissible contacts during a Governmental Procurement pursuant to subdivision three of this section.

Instructions:

A Governmental Entity must obtain the required affirmation of understanding and agreement to comply with procedures on procurement lobbying restrictions regarding permissible Contacts in the restricted period for a procurement contract in accordance with State Finance Law § § 139-j and 139-k. It is recommended that this affirmation be obtained as early as possible in the procurement process, such as when the Offerer submits its proposal or bid. The following language can be used to obtain the affirmation.

Offerer affirms that it understands and agrees to comply with the procedures of the Government Entity relative to permissible Contacts as required by State Finance Law § 139-j (3) and § 139-j (6) (b).

By: _____ Date: _____

Name: _____

Title: _____

Contractor Name: _____

Contractor Address: _____

Model Language to Obtain the Offerer Disclosure of Prior Non-Responsibility Determinations

Background:

Under New York State Finance Law § 139-k(2) and Executive Order 127, covered governmental entities are obligated to obtain specific information regarding prior non-responsibility determinations. This information must be collected in addition to the information that is separately obtained pursuant to State Finance Law § 163(9). In accordance with State Finance Law § 139-k, an Offerer must be asked to disclose whether there has been a finding of non-responsibility made within the previous four (4) years by an Governmental Entity due to: (a) a violation of State Finance Law § 139-j or (b) the intentional provision of false or incomplete information to a Governmental Entity. The terms "Offerer" and "Governmental Entity" are defined in State Finance Law § 139-k(1). State Finance Law § 139-j sets forth detailed requirements about the restrictions on Contacts during the procurement process. A violation of State Finance Law § 139-j includes, but is not limited to, an impermissible Contact during the restricted period (for example, contacting a person or entity other than the designated contact person, when such Contact does not fall within one of the exemptions). Under Executive Order 127, a proposed contractor must disclose findings of non-responsibility made within the previous five (5) years.

As part of its responsibility determination, a covered governmental entity must consider whether an Offerer fails to timely disclose accurate or complete information regarding the above non-responsibility determination. In accordance with law, no Procurement Contract shall be awarded to any Offerer that fails to timely disclose accurate or complete information under this section, unless a finding is made that the award of the Procurement Contract to the Offerer is necessary to protect public property or public health safety, and that the Offerer is the only source capable of supplying the required Article of Procurement within the necessary timeframe.

Instructions:

A Governmental Entity must include a disclosure request regarding prior non-responsibility determinations in its solicitation of proposals or bid documents or specifications or contract documents, as applicable, for procurement contracts. The attached form is to be completed and submitted by the individual or entity seeking to enter into a Procurement Contract.

Offerer Disclosure of Prior Non-Responsibility Determinations

Name of Individual or Entity Seeking to Enter into the Procurement Contract:

Address:

Name and Title of Person Submitting this Form:

Contract Procurement Number:

Date:

1. Has any Governmental Entity made a finding of non-responsibility regarding the individual or entity seeking to enter into the Procurement Contract in the previous five years? (Please circle):		
No		Yes
If yes, please answer the next questions:		
2. Was the basis for the finding of non-responsibility due to a violation of		
(a) State Finance Law § 139-j (Please circle)		
No		Yes
(b) Executive Order 127 (Please circle)		
No		Yes
3. Was the basis for the finding of non-responsibility due to the intentional provision of false or incomplete information to a Governmental Entity? (Please circle)		
No		Yes
4. If you answered yes to any of the above questions, please provide details regarding the finding of non-responsibility below.		
Governmental Entity: _____		
Date of Finding of Non-Responsibility: _____		
Basis of Finding of Non-Responsibility: _____		

(Add additional pages as necessary)		
5. Has any Governmental Entity or other governmental agency terminated or withheld a Procurement Contract with the above-named individual or entity due to the intentional provision of false or incomplete information? (Please circle)		
No		Yes

ATTACHMENT 5

5

6. If yes, please provide details below.

Governmental Entity: _____

Date of Termination or Withholding of Contract: _____

Basis of Termination or Withholding: _____

(Add additional pages as necessary)

Offerer certifies that all information provided to the Governmental Entity with respect to State Finance Law § 139-k and Executive Order 127 is complete, true and accurate.

By: _____ Date: _____
Signature

Name: _____

Title: _____

**Policy Regarding Permissible Contacts
Under State Finance Law Section 139-j and 139-k**

with respect to procurements by

**New York State Urban Development Corporation d/b/a
Empire State Development Corporation
and its subsidiaries**

The Lower Manhattan Development Corporation (“LMDC”), a subsidiary of the Empire State Development Corporation, amends and restates in its entirety Section 7 of the ESDC’s Policy Regarding Permissible Contacts, as follows:

7. Miscellaneous

- a. Complaints or other notices to the General Counsel of LMDC regarding the implementation of this policy shall identify the solicitation with respect to which the complaint or notice is being submitted; the entity conducting the procurement at issue; and the nature of the complaint or notice, and should be submitted to the General Counsel of LMDC at the following address, for further forwarding, if necessary:

General Counsel
Lower Manhattan Development Corporation
One Liberty Plaza
20th Floor
New York, NY 10006

- b. This policy is adopted pursuant to Sections 139-j and 139-k of the State Finance Law. Nothing in this policy shall be construed as limiting the application of this law. In the event of a conflict between the provisions of this policy and the provisions of State Finance Law Sections 139-j and 139-k, the provisions of said Law shall govern.

As of April 12, 2006

**Policy Regarding Permissible Contacts
under State Finance Law Section 139-j and 139-k**

with respect to procurements by

**New York State Urban Development Corporation d/b/a
Empire State Development Corporation**
and its subsidiaries

1. Definitions

The following terms shall have the following meanings:

- a. "contact" or "contacts" shall mean any oral, written or electronic communication with the Corporation under circumstances from which a reasonable person would infer that the communication was intended to influence a procurement by the Corporation.
- b. "Corporation" shall mean ESDC or any of its subsidiaries, as the case may be.
- c. "ESDC" shall mean the New York State Urban Development Corporation d/b/a Empire State Development Corporation.
- d. "offerer" shall mean the individual or entity, or any employee, agent or consultant or person acting on behalf of such individual or entity, that makes a contact during the restricted period.
- e. "procurement" shall mean (i) the preparation of terms of the specifications, bid documents, request for proposals, or evaluation criteria for a procurement contract; (ii) solicitation for a procurement contract; (iii) evaluation of a procurement contract; (iv) award, approval, denial or disapproval of a procurement contract, or (v) approval or denial of an assignment, amendment (other than amendments that are authorized and payable under the terms of the procurement contract as it was finally awarded or approved), renewal or extension of a procurement contract, or any other material change in the procurement contract resulting in a financial benefit to the offerer.
- f. "procurement contract" shall mean any contract or other agreement for a commodity, service, technology, public work, construction, the grant of a franchise or concession, the purchase, sale or lease of real property or an acquisition or granting of other interest in real property which contract or other agreement involves an estimated annualized expenditure in excess of fifteen thousand dollars. Grants, eminent domain transactions and other transactions listed in subdivision (1)(g) of Section 139-j of the State Finance Law shall not be deemed procurement contracts.

- g. "restricted period" shall mean the period of time commencing with the earliest written notice or advertisement of the availability of the solicitation document for a procurement contract and concluding with the execution of a final procurement contract.

2. Permissible Contacts during the Restricted Period

- a. With respect to each procurement that it conducts, the Corporation shall designate a person or persons who may be contacted by offerers relative to the procurement. All comments and questions from offerers regarding a procurement should generally be in writing and must be addressed only to the contact person(s) identified in the solicitation document or otherwise identified to offerers.
- b. During the restricted period, offerers shall only communicate, with respect to any procurement, in the manner and with the individuals set forth in Section 2 (a) of this Policy.
- c. Notwithstanding Section 2(b) of this Policy, offerers may:
 - i. submit proposals in response to a solicitation document;
 - ii. submit written questions as may be provided for in the solicitation document;
 - iii. participate in any pre-bid conference or site visit as may be provided for in the solicitation document;
 - iv. make a complaint in writing to the general counsel of the Corporation if a communication by an offerer made in accordance with Section 2(a) of this policy has not been responded to in a timely manner;
 - v. after being notified of a tentative award of a procurement contract, engage in communications solely for the purpose of negotiating the terms of the final contract or contracts and any interim agreements in advance of the final contract or contract, including any conditional designation document;
 - vi. request the review of an award of a procurement contract;
 - vii. participate in protests, appeals or other review proceedings (including the apparent successful respondent and its representatives) seeking a final administrative or judicial determination;
 - viii. make a complaint to the attorney general, inspector general, district attorney or court of competent jurisdiction regarding alleged improper conduct with respect to the procurement; and
 - ix. communicate with a member of the New York State legislature or legislative staff about the procurement.
- d. Offerers shall not attempt to influence the conduct of, and award of a contract under, the procurement in a manner that would result in a violation or an attempted violation of Section 73(5) (regarding certain gifts) and Section 74 (code of ethics) of the Public Officers Law. Each respondent to the solicitation must submit a properly completed

Contractor's Disclosure of Contacts form, in accordance with Executive Order 127 (Providing for Additional State Procurement Disclosure) with its proposal.

- e. As early as practicable during the restricted period, the Corporation shall seek a written affirmation from each offerer as to its understanding of and agreement to comply with State Finance Law Section 139-j and this Policy regarding permissible contacts during the restricted period. Each respondent to a solicitation who has not submitted such an affirmation prior to submitting a proposal, must submit such a written affirmation with its proposal.

3. Recording of Contacts

Upon receiving any contact during the restricted period, Corporation staff shall make a record of such contact, including the name, address, telephone number, place of principal employment and occupation of the person or organization making the contact and whether the person or organization making the contact was the potential respondent itself or was retained, employed or designated by or on behalf of the potential respondent.

4. Violations of Requirements Regarding Permissible Contacts

- a. Any member, officer or employee of the Corporation who becomes aware that an offerer has violated the provisions of State Finance Law 139-j(3) or Section 2 of this Policy regarding permissible contacts during the restricted period shall immediately notify the General Counsel of the Corporation of the impermissible contact and shall provide the Corporation's General Counsel with a copy of the record of contact.
- b. If any member, officer or employee of a governmental entity other than the Corporation becomes aware that violation regarding permissible contacts with respect to a procurement has occurred involving such other governmental entity, then such member, officer or employee shall make a record of such impermissible contact and shall immediately notify the ethics officer, inspector general, if any, or other official of the other governmental entity responsible for investigating such matters, who shall in turn notify the Corporation's General Counsel and provide the General Counsel with a copy of the record of contact.
- c. Upon receiving notice of an impermissible contact with respect to a procurement, the Corporation's General Counsel will conduct an investigation to determine whether an impermissible contact occurred and, if so, whether such impermissible contact was knowing and willful. The investigation shall include review of the record of contact and may include an interview of the individual making the report and other involved staff. The investigation may include review of such other documents or the interview of such other individuals as the General Counsel in his or her discretion may consider appropriate.

- d. The Corporation's General Counsel shall endeavor to make a determination, within ten business days of receiving any notice of impermissible contact, whether sufficient cause exists to believe that the impermissible contact occurred and that such contact was knowing and willful, but in any event shall make such determination before the award of a final procurement contract or contracts. In the event it is determined that sufficient cause exists to believe that the impermissible contact occurred and was knowing and willful, then the General Counsel shall notify the involved offerer of the date and nature of the alleged impermissible contact and of the preliminary determination that such contact was knowing and willful.
- e. The offerer shall be provided with an opportunity to submit a written response to the alleged impermissible contact within ten business days of receiving such notice. In the General Counsel's discretion, an interview with the offerer may be granted or required. In making a final determination regarding an allegation of impermissible contact, the General Counsel shall take into consideration any information provided by the offerer during the course of the investigation.
- f. In the event the General Counsel makes a final determination that an offerer has knowingly and willfully violated this policy or Section 139-j of the State Finance Law and such violation involved misconduct by a GIPEC employee in the implementation of this policy, then the General Counsel shall report such instance of employee misconduct to the Corporation's President.
- g. The notice provided for in Section 4(d) above may be sent by facsimile transmission or electronic mail provided that hard copy of such notice is also sent by overnight, personal or other method of delivery providing a delivery receipt, to the offerer at the address listed on the report of contact, in the offerer's proposal or such other address as the General Counsel may deem most appropriate.
- h. Prior to awarding any procurement contract, the Corporation shall make a determination of responsibility with respect to the proposed awardee. In making a determination of responsibility with respect to any offerer, the Corporation shall consider the proposed awardee's ability to perform the services provided for in the proposed contract including but not limited to such factors as the offerer's financial capability; level of relevant expertise; depth and qualifications of staff; if applicable, the offerer's prior performance under contracts with ESDC or any subsidiary of ESDC or other instrumentality of the State of New York; and any prior findings of non-responsibility with respect to such offerer (by any governmental entity, as defined in section (1)(a) of State Finance Law Section 139-j) made within the preceding four years.
- i. Notwithstanding any of the criteria set forth in section 4(g) above, either of the following shall result in a determination of non-responsibility with respect to any offerer: (I) a final determination, pursuant to the procedure set forth in this section 4,

that such offerer has knowingly and willfully violated the provisions of this policy or State Finance Law Section 139-j, and (II) the failure by such offerer to timely disclose accurate and complete information or otherwise cooperate with the Corporation in administering this policy and the provisions of State Finance Law Section 139-j.

- j. In the event an offerer is determined to be non-responsible, such offerer and its subsidiaries and any related or successor entity with substantially similar function, management, board of directors, officers and shareholders shall not be awarded any contract pursuant to the procurement unless, by action of the Board of Directors, the Corporation finds that the award is necessary to protect public property or public health or safety and that the offerer is the only source capable of performing the contract. Any such action by the Corporation's Board of Directors shall state the basis for the finding of necessity and a record of the action and the basis shall be included in the procurement record.
- k. Any subsequent determination of non-responsibility due to a violation of State Finance Law Section 139-j within four years of a determination of non-responsibility due to such a violation shall result in the offerer's being rendered ineligible to submit a proposal on or be awarded any procurement contract for any governmental entity subject to the provisions of State Finance Law Section 139-j for a period of four years from the date of the second determination of non-responsibility.
- l. Upon making any determination of non-responsibility or ineligibility under this Section 4, the Corporation shall notify the New York State Office of General Services so that the offerer that is the subject of such determination will be included in the list of all offerers who have been determined to be non-responsible or ineligible, which list is published on the Office of General Services' website and is publicly available.

5. Required Contractual Provisions

Each procurement contract awarded by the Corporation shall contain (a) a certification by the offerer that all information provided to the Corporation with respect to Executive Order 127 and State Finance Law Section 139-j is true, complete and accurate; and (b) a provision authorizing the Corporation to terminate the contract in the event such certification is found to be intentionally false or intentionally incomplete.

6. Procurement Record

- a. The Corporation shall maintain a procurement record with respect to the procurement and the ultimate award of contracts thereunder. The procurement record shall contain such documents as evidence the material decisions made and approach taken in the procurement process, including, without limitation, the following:

- i. a full copy of the solicitation document(s) and all addenda thereto;
 - ii. a copy of all questions and answers made available to offerers;
 - iii. copies of all proposals submitted in response to the solicitation;
 - iv. all Contractor Disclosure of Contacts forms submitted in accordance with Executive Order 127;
 - v. all records of contacts, Offerer Disclosure of Prior Non-Responsibility Determinations and Offerer Affirmation of Understanding of and Agreement pursuant to State Finance Law Section 139-j made or submitted in accordance with said Section of the State Finance Law;
 - vi. all complaints to the General Counsel made pursuant to this policy; all records of the General Counsel with respect to any investigation into any allegation of a knowing and willful violation of the provisions of this policy and the State Finance Law Section 139-j regarding permissible contacts and all determinations made pursuant to such investigation;
 - vii. all determinations of responsibility or non-responsibility and other documentation of evaluations by or on behalf of the Corporation of responses to the solicitation;
 - viii. a statement describing the basis for any action taken to terminate the procurement contract because of a false, incomplete or inaccurate certification of compliance with or other violation of Executive Order 127 or State Finance Law Section 139-j.
- b. All documents comprising the procurement record shall be subject to disclosure in accordance with the provisions of the Freedom of Information Law and any other applicable law.

7. Miscellaneous

- a. Complaints or other notices to the General Counsel of the Corporation regarding the implementation of this policy shall identify the solicitation with respect to which the complaint or notice is being submitted; the entity conducting the procurement at issue; and the nature of the complaint or notice, and should be submitted to the General Counsel of ESDC at the following address, for further forwarding, if necessary:

General Counsel
 Empire State Development Corporation
 633 Third Avenue
 New York, NY 10017

- b. This policy is adopted pursuant Sections 139-j and 139-k of the State Finance Law. Nothing in this policy shall be construed as limiting the application of this law. In the event of a conflict between the provisions of this policy and the provisions of State Finance Law Sections 139-j and 139-k, the provisions of said Law shall govern.

Bid Bond

(attach two originals)

BIDDER (Name and Address): _____

SURETY (Name and Address of Principal Place of Business): _____

OWNER (Name and Address): Lower Manhattan Development Corporation
One Liberty Plaza, 20th Floor
New York, New York 10006

PROJECT TO BE BID: The selection, tagging, acquisition, digging, transfer, delivery, installation, and maintenance of the trees for the World Trade Center Memorial.

BID DUE DATE: July 17, 2006 at 5:00 p.m. EST

BOND

BOND NUMBER: _____
DATE: (Not later than Bid Due Date): _____
PENAL SUM: (10% of Bid Amount)

1. Bidder and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to pay to LMDC upon default of Bidder any difference between the total amount of Bidder's bid and the total amount of the bid of the next lowest, responsible and responsive bidder as determined by LMDC for the Work required by the Contract Documents, provided that:
 - 1.1 If there is no such next lowest, responsible bidder, then Bidder and Surety shall pay to LMDC the penal sum set forth on the face of this Bond, and
 - 1.2 In no event shall Bidder's and Surety's obligations hereunder exceed the penal sum set forth on the face of this Bond.
2. Default of Bidder shall occur upon the failure of Bidder to deliver within the time required by the Invitation to Bid (or any extension thereof agreed to in writing by LMDC) the executed contract required by the Invitation to Bid and any performance and payment bonds required by such contract.
3. This obligation shall be null and void if:
 - 3.1 LMDC accepts Bidder's bid and bidder delivers within the time required by the Invitation to Bid (or any extension thereof agreed to in writing by LMDC) the executed contract required by the Invitation to Bid and any performance and payment bonds required by such contract, or
 - 3.2 All bids are rejected by LMDC, or

Trees for WTC Memorial

- 3.3 LMDC fails to issue a notice of award to Bidder within sixty (60) days after the last date for submissions of bids (or any extension thereof agreed to in writing by Bidder and, if applicable, consented to by Surety when required by paragraph 5 hereof).
4. Payment under this Bond will be due and payable upon default by Bidder and within 30 calendar days after receipt by Bidder and Surety of written notice of default from LMDC, which notice will be given with reasonable promptness, identifying this Bond and the Project and including a statement of the amount due.
5. Surety waives notice of and any and all defenses based on or arising out of any time extension to issue notice of award agreed to in writing by LMDC and Bidder, provided that the total time for issuing notice of award including extensions shall not in the aggregate exceed 120 days from the date of the bid without Surety's written consent.
6. No suit or action shall be commenced under this Bond prior to 30 calendar days after the notice of default required in paragraph 4 above is received by Bidder and Surety and in no case later than one year after due date for the bid as set forth in the Invitation to Bid.
7. Any suit or action shall be heard and determined only in a court of competent jurisdiction located in the City and County of New York.
8. Notices required hereunder shall be in writing and sent to Bidder and Surety at their respective addresses shown on the face of this Bond. Such notices may be sent by personal delivery, commercial courier or by United States Registered or Certified Mail, Return Receipt Requested, postage pre-paid, and shall be deemed to be effective upon receipt by the party concerned.
9. Surety shall cause to be attached to this Bond a current and effective Power of Attorney evidencing the authority of the officer, agent or representative who executed this Bond on behalf of Surety to execute, seal and deliver such Bond and bind the Surety thereby.
10. This Bond is intended to conform to all applicable statutory requirements. Any applicable requirement of any applicable statute that has been omitted from this Bond shall be deemed to be included herein as if set forth at length. If any provision of this Bond conflicts with any applicable provision of any applicable statute, then the provision of said statute shall govern and the remainder of this Bond that is not in conflict therewith shall continue in full force and effect.
11. The term "bid" as used herein includes a bid, offer or proposal, as applicable.

IN WITNESS WHEREOF, Surety and Bidder, intending to be legally bound hereby, subject to the terms on the following page, do each cause this Bid Bond to be duly executed on its behalf by its authorized officer, agent, or representative.

BIDDER

_____(Seal)
Bidder's Name and Corporate Seal

By: _____
Signature and Title

Attest: _____
Signature and Title

SURETY

_____(Seal)
Surety's Name and Corporate Seal

By: _____
Signature and Title
(Attach Power of Attorney)

Attest: _____
Signature and Title

Note:

- (1) Above addresses are to be used for giving required notice.
- (2) Any singular reference to Bidder, Surety, or other party shall be considered plural where applicable.

ACKNOWLEDGMENT OF PRINCIPAL, IF A CORPORATION

STATE OF)
) ss:
COUNTY OF)

On this ____ day of _____, 2006, before me personally came _____, to me known, who, being by me duly sworn, did depose and say that he resides at _____, that he is the _____ of _____, the corporation described in and which executed the foregoing instrument; that he signed his name thereto by order of the directors of said corporation.

Notary Public or Commissioner of Deeds

ACKNOWLEDGMENT OF PRINCIPAL, IF A PARTNERSHIP

STATE OF)
) ss:
COUNTY OF)

On this ____ day of _____, 2006, before me personally came _____, to me known, who, being by me duly sworn, did depose and say that he resides at _____, that he is the _____ of _____, the partnership described in and which executed the foregoing instrument; that he signed his name thereto by order of said partnership.

Notary Public or Commissioner of Deeds

ACKNOWLEDGMENT OF PRINCIPAL, IF AN INDIVIDUAL

STATE OF)
) ss:
COUNTY OF)

On this ____ day of _____, 2006, before me personally came _____, to me known, who, being by me duly sworn, did depose and say that he resides at _____, that he is the individual who executed the foregoing instrument, and that he signed his name thereto.

Notary Public or Commissioner of Deeds

AFFIX ACKNOWLEDGMENTS OF BID BOND, JUSTIFICATION OF SURETIES AND/OR COPIES

Project Approach and Methodology

[Contractor to Attach]

OCIP Bid Worksheet – Insurance Costs

[attached]

Bid Worksheet - Insurance Cost

Initial & Minimum Deduction Form

The Owner, at its election, may provide Contractor, its Subcontractors of all tiers, with insurance coverages under the Owner Controlled Insurance Program (OCIP) for work performed at the Project Site. Your bid shall include all costs for insurance.

The insurance costs within your bid shall include all required coverage for work at the Project Site as described on Page 1, Item C.

Contractor Insurance Cost Identification

Contractors and subcontractors of all tiers shall identify the cost of insurance on the Form 1 (Bid Worksheet - Insurance Cost). Contractors and Subcontractors of every tier agree to identify all costs associated with the cost of insurance for all work, including but not limited to insurance premiums, expected losses within any retention or deductible program, overhead and profit. The Contractors and Subcontractors of every tier shall submit a copy of their declaration pages(s) and premium rate page(s) to support the accuracy of each Contractor/Subcontractor's cost of insurance as identified on the Form

The Contractor/Subcontractor shall identify their cost for providing workers' compensation, general liability and excess liability exposures associated with the contract work for the following limits and coverages:

Insurance Description	Limits
Workers Compensation	Statutory
Employers Liability	\$500,000/\$1,000,000
Commercial General Liability	\$10,000,000 *

* \$100,000,000 for Construction Manager

(1) Workers' Compensation and Employer's Liability Insurance:

Statutory Limits with All States Endorsement; and Employer's Liability Limits:

(2) Commercial General Liability Insurance:

Coverages should include but not limited to the following supplementary coverages:

- i. Contractual Liability to cover liability assumed under this agreement;
- ii. Premises operations;
- iii. Explosion, collapse and underground hazards (deletion of the X,C,U exclusions);
- iv. Products/Completed Operations;
- v. Broad Form Property Damage; and
- vi. Independent Contractors.

Bid Worksheet - Insurance Cost

(3) Excess Liability Insurance:

Coverages and Terms:

- i. Excess of General Liability
- ii. Excess of Employer's Liability
- iii. Completed Operations

OCIP participants should base their respective insurance premium costs and indicate the bid add alternate on Form 1 on the above requirements, as though you were furnishing the insurance in lieu of the Sponsor. The final insurance cost will be subject to review and audit of actual insurance policy(ies) rate information, actual payrolls and revenues for the initial award plus any additive amendments. During the term of contractor/subcontractor's contract, including extended periods thereof, the Sponsor shall have the right to recover all costs for insurance as described above that are in addition to those initially identified by the contractor/subcontractor in the initial insurance add alternate. Sponsor shall have the right to recover these additional costs through deductive change orders. If the audit shows a return, the Sponsor shall have the right to return these costs to the contractor/subcontractor through change orders.

It is a requirement that each bidder identify the cost of providing Workers' Compensation, General Liability and Umbrella Excess Liability insurance (including burden for overhead and profit) for work at the project site. The bidder evidences that the insurance costs identified in the bid reflect actual costs for the full term of the Contractors contract and includes all self-performed work and all work to be performed by all subcontractors of every tier in performance of the work under this contract. The Durst Organization has the right to require the bidder to supply any requested information which the Durst Organization, or its representatives deem necessary to verify the accuracy of the bid forms.

Should the Sponsor elect to provide the OCIP coverages to the Contractor and/or its Subcontractors, the Sponsor will reduce the Contract Amount to reflect the insurance costs as identified on the Bid Worksheet Form 1. Should the Owner elect not to provide the OCIP coverages to the Contractor and/or its Subcontractors, the Contract Amount shall include the insurance costs as identified on the Bid Worksheet Form 1.

This bid includes the following insurance costs for all work performed at the project site under this bid package.

Workers' Compensation	A.	\$ _____
General Liability	B.	\$ _____
Umbrella (Excess) Liability	C.	\$ _____
Subcontractor Cost	D.	\$ _____
Overhead & Profit Charge	E.	\$ _____
Total Initial and Minimum Deduction	F.	\$ _____
Total Estimated Manhours		_____

THIS FORM MUST BE SUBMITTED WITH YOUR BID AND YOUR WORKERS COMPENSATION, GENERAL LIABILITY AND EXCESS LIABILITY POLICY DECLARATION PAGES AND RATING SHEETS.

(Sponsor)
OCIP Project Located At

Bid Worksheet - Insurance Cost

Complete a separate worksheet for each Contractor and Subcontractor (Required Part of Bid – Must include all Subcontractors – Duplicate this form if necessary)

CONTRACTOR INFORMATION:

Contractor: _____ Contact: _____
 Address: _____ City _____ State __ Zip _____ Phone: _____
 Fax: _____

CONTRACT INFORMATION

Contract Value: \$ _____

Project Name: _____ Start Date: _____ Est. Completion
 Date: _____

Awarding Contractor: _____ Construction Manager: _____
 % Self Performed _____ Est. Manhours _____ Est. # of Subcontractors _____ Est. Manhours _____

FOR WORK TO BE PERFORMED UNDER THIS CONTRACT:

Required limits and coverages are shown in Contractors Insurance Manual.

<u>A. Workers Compensation**</u>	Code	Rate	Estimated Payroll	Limited Payroll*	Premium
1.			\$	\$	\$
2.			\$	\$	\$
3.			\$	\$	\$
4.			\$	\$	\$
WC Subtotal			\$	\$	\$
It is extremely important to accurately estimate payrolls anticipated for this contract. Payroll should be raw wages <u>without</u> burden, fringes, or overtime premium: but should include sick, vacation, holiday pay and imputed income. *Limitation allowed by the New York Construction Employment Payroll Limitation Program. The limited payroll <u>only</u> applies to Workers' Compensation.				Increased Limits Factor WC Experience Mod. NY Territory Differential WC Discounts WC State Assessments	\$ \$ \$ \$ \$
Total WC Premium					A.\$
<u>B. General Liability**</u>	Code	Rate	Estimated Payroll/Receipts*		Premium
1.			\$		\$
2.			\$		\$
3.			\$		\$
4.			\$		\$
GL Discount (describe)					\$
GL Surcharge (describe)					\$
Total General Liability					B.\$
C. Umbrella/Excess Liability ** Basis: _____ Rate: _____			\$		C.\$
D. Estimated Subcontractor Premiums (Attach Form 1 Each Subcontractor (including leasing and/or temporary labor companies) if subcontractors have not been identified, use 3% of subcontract value for this costs).			\$		D.\$
E. Overhead & Profit on Insurance Cost					E.\$
TOTAL (A+B+C+D+E) Cost					F.\$
**NOTE: Although Deductible and Self-Insured Retention Credits are to be identified, they will not be allowed. Since these types of programs also require loss funding, the credits will be substituted for the loss pick. The OCIP provides first dollar coverage for all contractors.					

Signed _____ Title _____ Date _____

Form ST-220 – Contractor Certification

[Attached]



Contractor Certification

(Pursuant to Section 5-a of the Tax Law)

For more information, see Publication 222, *Question and Answers Concerning Tax Law Section 5-a.*

Contractor name				For covered agency use only Contract number or description
Contractor's principal place of business	City	State	ZIP code	
Mailing address (if different than above)				
Contractor's federal employer identification number (EIN)		Contractor's sales tax ID number (if different from contractor's EIN)		Estimated contract value over the full term of contract (but not including renewals)
Contractor's telephone number ()	Covered agency			
				\$

I, _____, hereby affirm, under penalty of perjury, that I am _____
(name) (title)

of the above-named contractor, that I am authorized to make this certification on behalf of such contractor, and that to the best of my knowledge:

Part I. Contract not covered by section 5-a of the Tax Law

(Mark an X in the box if this statement is applicable. If you mark this box, you do not have to complete Parts II through V.)

The requirements of section 5-a of the Tax Law do not apply to this contract (provide a separate explanation and attach to this form).

(If you did not mark the box next to the statement in Part I, mark an X next to the applicable statement in Parts II through IV and, if applicable, Part V.)

Part II. Contractor registration status

The contractor has made sales delivered by any means to locations within New York State of tangible personal property or taxable services having a cumulative value in excess of \$300,000 during the four quarterly periods ending on the last day of February, May, August, and November which immediately precede the quarterly period in which this certification is made and for which information is available, and is registered for New York State and local sales and compensating use tax purposes with the Commissioner of Taxation and Finance pursuant to sections 1134 and 1253 of the Tax Law. The contractor is listed on Schedule A of this certification.

As of the date of this certification, the contractor has not made sales delivered by any means to locations within New York State of tangible personal property or taxable services having a cumulative value in excess of \$300,000 during the four quarterly periods ending on the last day of February, May, August, and November which immediately precede the quarterly period in which this certification is made and for which information is available.

Part III. Affiliate registration status

As of the date of this certification, the contractor does not have any affiliates.

The contractor has one or more affiliates having made sales delivered by any means to locations within New York State of tangible personal property or taxable services having a cumulative value in excess of \$300,000 during the four quarterly periods ending on the last day of February, May, August, and November which immediately precede the quarterly period in which this certification is made and for which information is available, and each affiliate exceeding the \$300,000 cumulative sales threshold during such periods is registered for New York State and local sales and compensating use tax purposes with the Commissioner of Taxation and Finance pursuant to sections 1134 and 1253 of the Tax Law. The contractor has listed each affiliate exceeding the \$300,000 cumulative sales threshold during such periods on Schedule A of this certification.

The contractor has one or more affiliates and, as of the date of this certification, each affiliate has not made sales delivered by any means to locations within New York State of tangible personal property or taxable services having a cumulative value in excess of \$300,000 during the four quarterly periods ending on the last day of February, May, August, and November which immediately precede the quarterly period in which this certification is made and for which information is available.

Part IV. Subcontractor registration status

- As of the date of this certification, the contractor does not have any subcontractors.
- The contractor has one or more subcontractors, and each subcontractor has informed the contractor of whether or not, as of the date of this certification, it has made sales delivered by any means to locations within New York State of tangible personal property or taxable services having a cumulative value in excess of \$300,000 during the four quarterly periods ending on the last day of February, May, August, and November which immediately precede the quarterly period in which this certification is made and for which information is available. Each subcontractor informing the contractor that it has made sales in excess of the \$300,000 cumulative sales threshold during such periods has further informed the contractor that it is registered for New York State and local sales and compensating use tax purposes with the Commissioner of Taxation and Finance pursuant to sections 1134 and 1253 of the Tax Law. The contractor has listed each subcontractor exceeding the \$300,000 cumulative sales threshold during such periods on Schedule A of this certification.
- The contractor has one or more subcontractors, and each subcontractor has informed the contractor that, as of the date of this certification, it has not made sales delivered by any means to locations within New York State of tangible personal property or taxable services having a cumulative value in excess of \$300,000 during the four quarterly periods ending on the last day of February, May, August, and November which immediately precede the quarterly period in which this certification is made and for which information is available.

Part V. Subcontractor affiliate registration status

- The contractor has one or more subcontractors, and each subcontractor has informed the contractor that, as of the date of this certification, it does not have any affiliates.
- The contractor has one or more subcontractors, and each subcontractor has informed the contractor of whether or not, as of the date of this certification, it has any affiliates having made sales delivered by any means to locations within New York State of tangible personal property or taxable services having a cumulative value in excess of \$300,000 during the four quarterly periods ending on the last day of February, May, August, and November which immediately precede the quarterly period in which this certification is made and for which information is available. Each subcontractor informing the contractor that it has one or more affiliates having made sales in excess of the \$300,000 cumulative sales threshold during such periods has further informed the contractor that each such affiliate is registered for New York State and local sales and compensating use tax purposes with the Commissioner of Taxation and Finance pursuant to sections 1134 and 1253 of the Tax Law. The contractor has listed each subcontractor affiliate exceeding the \$300,000 cumulative sales threshold during such periods on Schedule A of this certification.
- The contractor has one or more subcontractors, and each subcontractor has informed the contractor that, as of the date of this certification, it has no affiliate having made sales delivered by any means to locations within New York State of tangible personal property or taxable services having a cumulative value in excess of \$300,000 during the four quarterly periods ending on the last day of February, May, August, and November which immediately precede the quarterly period in which this certification is made and for which information is available.

Sworn to this ____ day of _____, 20 ____

(signature)

(title)

Individual, Corporation, Partnership, or LLC Acknowledgment

STATE OF }
: SS.:
COUNTY OF }

On the day ___ of _____ in the year 20___, before me personally appeared _____,
known to me to be the person who executed the foregoing instrument, who, being duly sworn by me did depose and say that
_he resides at _____,

Town of _____,

County of _____,

State of _____; and further that:

[Mark an X in the appropriate box and complete the accompanying statement.]

[] (If an individual): _he executed the foregoing instrument in his/her name and on his/her own behalf.

[] (If a corporation): _he is the _____
of _____, the corporation described in said instrument; that, by authority of the Board
of Directors of said corporation, _he is authorized to execute the foregoing instrument on behalf of the corporation for
purposes set forth therein; and that, pursuant to that authority, _he executed the foregoing instrument in the name of and on
behalf of said corporation as the act and deed of said corporation.

[] (If a partnership): _he is the _____
of _____, the partnership described in said instrument; that, by the terms of said
partnership, _he is authorized to execute the foregoing instrument on behalf of the partnership for purposes set forth
therein; and that, pursuant to that authority, _he executed the foregoing instrument in the name of and on behalf of said
partnership as the act and deed of said partnership.

[] (If a limited liability company): _he is a duly authorized member of, _____
LLC, the limited liability company described in said instrument; that _he is authorized to execute the foregoing instrument
on behalf of the limited liability company for purposes set forth therein; and that, pursuant to that authority, _he executed
the foregoing instrument in the name of and on behalf of said limited liability company as the act and deed of said limited
liability company.

Notary Public

Registration No.

Schedule A — Listing of persons exceeding \$300,000 cumulative sales threshold

A Relationship to Contractor	B Name	C Address	D Federal EIN	E Sales Tax ID Number	F Proof of Registration

- Column A – Enter **C** in column A if the contractor; do not complete columns C, D, and E. Enter **A** if an affiliate of the contractor; **S** if a subcontractor; or **SA** if an affiliate of a subcontractor, and complete columns B through F.
- Column B – Name - If person is a corporation or limited liability company, enter the exact legal name as registered with the NY Department of State. If person is a partnership or sole proprietor, enter the name of the partnership and each partner's given name, or the given name(s) of the owner(s), as applicable. If person has a different DBA (doing business as) name, enter that name as well.
- Column C – Address - Enter the street address of person's principal place of business. Do not enter a PO box.
- Column D – ID number - Enter the federal employer identification number (EIN) assigned to the person or person's business, as applicable. If the person is an individual, enter the social security number of that person.
- Column E – Sales tax ID number - Enter only if different from federal EIN in column D.
- Column F – Enter **CA** if a paper copy of the certificate of authority is attached; or **RC** if person is registered with the Tax Department (DTF) and has confirmed this status with DTF.

Privacy notification

The Commissioner of Taxation and Finance may collect and maintain personal information pursuant to the New York State Tax Law, including but not limited to, sections 5-a, 171, 171-a, 287, 308, 429, 475, 505, 697, 1096, 1142, and 1415 of that Law; and may require disclosure of social security numbers pursuant to 42 USC 405(c)(2)(C)(i).

This information will be used to determine and administer tax liabilities and, when authorized by law, for certain tax offset and exchange of tax information programs as well as for any other lawful purpose.

Information concerning quarterly wages paid to employees is provided to certain state agencies for purposes of fraud prevention, support enforcement, evaluation of the effectiveness of certain employment and training programs and other purposes authorized by law.

Failure to provide the required information may subject you to civil or criminal penalties, or both, under the Tax Law.

This information is maintained by the Director of Records Management and Data Entry, NYS Tax Department, W A Harriman Campus, Albany NY 12227; telephone 1 800 225-5829. From areas outside the United States and outside Canada, call (518) 485-6800.

Instructions

General information

Section 5-a of the Tax Law requires contractors awarded contracts valued at more than \$15,000 by state agencies, public authorities or public benefit corporations to certify that they, their affiliates, their subcontractors, and the affiliates of their subcontractors are registered to collect New York State and local sales and compensating use taxes. Contractors, affiliates, subcontractors and subcontractor affiliates must be registered if they made sales delivered by any means to locations within New York State of tangible personal property or taxable services having a cumulative value in excess of \$300,000 during the four quarterly periods ending on the last day of February, May, August, and November which immediately precede the quarterly period in which certification of registration is made and for which information is available. Certification of registration must be made before the contract can be approved by the Office of the State Comptroller, or other responsible party if OSC is not required to approve the contract. In addition, certification of registration must be made at specified intervals during the contract term.

For more detailed information regarding section 5-a of the Tax Law, see Publication 222, *Questions and Answers Concerning Tax Law Section 5-a*.

Meaning of terms used in section 5-a of the Tax Law

Contractor means a person awarded a contract.

Person includes an individual, partnership, limited liability company, society, association, joint-stock company, corporation, estate, receiver, trustee, assignee, referee and any other person acting in a fiduciary or representative capacity, whether appointed by a court or otherwise, and any combination of the foregoing.

Contract means an agreement between a contractor and a covered agency for the sale of commodities or services having a value in excess of \$15,000.

Covered agency means New York State, any department, board, bureau, commission, division, office, council or agency of New York State, and a public authority or public benefit corporation.

Sale means any transfer of title or possession or both, exchange or barter, rental, lease or license to use or consume. For computer software, the term *sale* also includes the right to reproduce the software.

Commodities include **either** commodities as defined for New York procurement law purposes, or tangible personal property as defined for New York State and local sales and compensating use tax law purposes. For procurement law purposes, the term *commodities* means (other than with respect to contracts for State printing) material goods, supplies, products, construction items, or other standard articles of commerce other than technology which are the subject of any purchase or other exchange. For New York State and local sales and compensating use tax law purposes, the term *tangible personal property* means corporeal personal property of any nature having a material existence and perceptible to the human senses. Tangible personal property includes without limitation: 1) raw materials, such as wood, metal, rubber and minerals; 2) manufactured items, such as gasoline, oil, diesel motor fuel and kero-jet fuel, chemicals, jewelry, furniture, machinery and equipment, parts, tools, supplies, computers, clothing, motor vehicles, boats, yachts, appliances, lighting fixtures, building materials; (3) pre-written, off-the-shelf software; (4) artistic items, such as sketches, paintings, photographs, moving picture films, and recordings; (5) animals, trees, shrubs, plants, and seeds; (6) bottled

water, soda, beer; (7) candy and confections; (8) cigarettes and tobacco products; (9) cosmetics and toiletries; (10) coins and other numismatic items, when purchased for purposes other than for use as a medium of exchange; (11) postage stamps, when purchased for purposes other than mailing; and (12) precious metals in the form of bullion, ingots, wafers and other forms. Tangible personal property does **not** include real property or intangible personal property.

Services include **either** services as defined for New York procurement law purposes, or taxable services as defined for New York State and local sales and compensating use tax law purposes. For procurement law purposes, the term *services* means (other than with respect to contracts for State printing) the performance of a task or tasks and may include a material good or a quantity of material goods, and which is the subject of a purchase or other exchange. For procurement law purposes, technology is a service. The term *services* for procurement law purposes does **not** apply to contracts for architectural, engineering or surveying services, or to contracts with not-for-profit organizations approved in accordance with Article 11-B of the State Finance Law. For New York State and local sales and compensating use tax law purposes, the term *taxable services* includes: 1) providing information by printed, mimeographed or multigraphed matter or by duplicating written or printed matter in any other manner, including the services of collecting, compiling, or analyzing information of any kind or nature and furnishing reports thereof to other persons; 2) processing, assembling, fabricating, printing, or imprinting tangible personal property furnished by a customer who did not purchase the tangible personal property for resale; 3) installing tangible personal property, or maintaining, servicing, or repairing tangible personal property that is not held for sale by the purchaser of the service; 4) storing tangible personal property that is not being held for sale, and the rental of safe deposit boxes or similar space; 5) maintaining, servicing or repairing real property, whether inside or outside buildings; 6) providing parking, garaging or storing for motor vehicles; 7) interior decorating and designing services; 8) protective and detective services; and 9) furnishing entertainment or information services by means of telephony or telegraphy.

Affiliate means a person which, through stock ownership or any other means, directly, indirectly or constructively controls another person, is controlled by another person, or is, along with another person, under the control of a common parent.

Subcontractor means a person providing commodities or performing services for a contractor or another subcontractor in fulfillment of a contract

Emergency means an urgent and unexpected requirement where health and public safety or the conservation of public resources is at risk.

Completing Form ST-220

Identification information

Contractor name: Enter the exact legal name of the person who is contracting to provide commodities or services to a covered agency.

Contractor's principal place of business: Enter a street address, not a PO box number.

Mailing address: Enter the address where the contractor receives mail, if different than the principal place of business.

Covered agency: Enter the name of the covered agency awarding the contract.

Covered agency use only

Contract number or description: If the contract has been assigned a number by the covered agency, enter that number. If a number has not been assigned, provide a brief description of the nature of the contract.

Estimated contract value: Enter the estimated contract value for the full term of the contract, but excluding any renewal terms.

Certification statement

If the contractor is a corporation, the certification must be completed by the president, vice president, treasurer, assistant treasurer, chief accounting officer, or other officer authorized by the corporation. If the contractor is a partnership, the statement must be completed by a partner or person authorized by the partnership. If the contractor is a limited liability company, the statement must be completed by a member of the LLC and be authorized by the LLC.

The person signing this certification must also complete the *Individual, Corporation, Partnership, or LLC Acknowledgement* (see page 3) and have it notarized.

Part I – Contract not covered by section 5-a of the Tax Law

If the contract is not covered by section 5-a of the Tax Law, mark an **X** in the box and attach a separate explanation as to why the contract is not covered. You do not have to complete Parts II through V. You must sign and have the certification acknowledged.

A contract would not be covered by section 5-a of the Tax Law if: 1) the covered agency began the procurement before January 1, 2005; 2) the procuring entity is not a *covered agency* within the meaning of section 5-a; 3) the contract does not have a value in excess of \$15,000; 4) the contract is not for commodities or services as such terms are defined for purposes of section 5-a; or 5) the contract is sole source, and is necessary to address an emergency, ensure the provision of essential services, or ensure the public health, safety and welfare.

Parts II through V

If the contract is covered under section 5-a of the Tax Law, you must mark an **X** in one box in Part II through Part IV and, if applicable, Part V. You must also sign and have the certification acknowledged, and complete Schedule A, if required.

For purposes of calculating if the contractor, contractor affiliate, subcontractor or subcontractor affiliate must be reported, the \$300,000 cumulative sales threshold includes all sales made by the entity to tax-exempt purchasers.

Schedule A

List the contractor, or an affiliate, subcontractor or subcontractor affiliate in Schedule A only if such person exceeded the more than \$300,000 cumulative sales threshold during the specified periods.

In addition, for each person listed in the Schedule A, proof of registration with the Tax Department for New York State and local sales and compensating use tax purposes is required. Proof of registration may be provided by furnishing a copy of the person's *Certificate of Authority* (a document issued by the Tax Department authorizing a person to collect and pay over New York State and local sales and compensating use taxes), or, if the *Certificate of Authority* is not available, registration may be verified by calling the Tax Department's Business Tax Information Center at 1 800 972-1233.

Column A – Relationship to the contractor

The contractor should enter a **C** in column A. It is not necessary for the contractor to complete columns B through E since this information has been provided on page 1.

If the person listed in column B is an affiliate of the contractor, enter an **A**; if a subcontractor, enter an **S**; if an affiliate of a subcontractor, enter **SA**.

Column B – Name

Enter the exact legal name as registered with the New York Department of State of each corporation or limited liability company. If the person is a partnership or sole proprietor, enter each partner's or the owner's given name. If the person uses a different name or DBA (doing business as), enter that name as well.

Column C – Address

Enter the street address of the person's principal place of business. Do not enter a PO box.

Column D – ID number

If the person listed in column B is an individual, enter the social security number of that person. Otherwise enter the employer identification number (EIN) assigned to the person.

Column E – Sales tax ID number

Enter the sales tax identification number, if different from the federal employer identification number.

Column F – Proof of registration

Enter **CA** and attach a copy of the *Certificate of Authority* for the person.

If the *Certificate of Authority* is not available and if the person is registered with the Department of Taxation and Finance and has verified this status with the DTF, enter **RC**.

Return a signed and acknowledged original Form ST-220, and a copy, to the procuring covered agency.

2

TRADE AGREEMENT

by and between

LOWER MANHATTAN DEVELOPMENT CORPORATION

and

_____,

for

World Trade Center Memorial

TREE ACQUISITION, INSTALLATION AND MAINTENANCE

New York, NY

dated as of

_____, 2006

TRADE AGREEMENT (the "Trade Agreement") dated as of _____, 2006 by and between LOWER MANHATTAN DEVELOPMENT CORPORATION, a subsidiary of the New York State Urban Development Corporation, d/b/a Empire State Development Corporation, with offices at One Liberty Plaza, 20th Floor, New York, NY 10006 ("LMDC" or "Owner") and _____, a [New York] [type of legal entity], with offices at _____ ("Contractor").

Introductory Statement

This Trade Agreement and the accompanying Contract Documents cover the selection, tagging, acquisition, pre-installation preparation, digging, transfer to the Tree Holding Facility, delivery to and installation at the Project Site and the post-installation maintenance at the Project Site of the trees described in Section 02931 of the Specifications ("WTC Memorial Trees"), and all other work required in connection therewith and as otherwise described hereunder (the "Project"), in connection with the construction of the World Trade Center Memorial (the "Memorial") and the World Trade Center Memorial Museum (the "Memorial Museum") located at the site of the World Trade Center ("WTC") in Lower Manhattan, New York ("Site" or "Project Site"). Contractor shall perform the Work pursuant to the terms and conditions of this Trade Agreement.

LMDC, in conjunction with the World Trade Center Memorial Foundation, Inc., a 501(c)(3) organization registered in the State of New York (the "Foundation" or the "Memorial Foundation"), is responsible for the construction of the Memorial and the Memorial Museum. As a recipient of funding from the United States Department of Housing and Urban Development ("HUD"), among others, LMDC, together with its contractors, is required to comply with a number of requirements with regard to both contract administration and performance of the Work.

Contractor agrees, also, that this Contract may be assigned to the construction manager or general contractor selected by Owner for the construction of the Memorial and Memorial Museum and that Contractor will in any event be subject and subordinate to the supervision, direction and control of any such construction manager or general contractor (as set forth in Article 8 below).

Contractor has advised Owner that Contractor is experienced and properly qualified and desires to perform and finish certain services in connection with the Project in accordance with the terms and conditions of the Contract Documents.

This Contract is for the selection, tagging, acquisition, pre-installation preparation, digging, transfer to the Tree Holding Facility, delivery to and installation at the Project Site and the post-installation maintenance of the WTC Memorial Trees at the Project Site and the furnishing of labor and materials necessary to perform such Work, and all other Work as referenced and as otherwise described in the Scope of Work, the Specifications and/or the Contract Drawings, and any other matters required of Contractor under the Contract Documents.

Contractor has agreed to complete the Work under this Contract on or before the Final Completion Date, time being of the essence, subject to extensions of time for Excusable Delays.

Words and phrases defined elsewhere in this Trade Agreement, in the General Conditions, or in other Contract Documents have the same meaning herein.

NOW, THEREFORE, in consideration of the mutual promises in this Contract, and subject to the terms of this Contract and intending to be legally bound hereby, Contractor and Owner agree to keep and perform their respective obligations in and under this Contract, which incorporates and consists of all the terms, covenants, conditions, and provisions listed in the following Table of Contents, the Trade Agreement (together with the Annexes attached hereto), the General Conditions (together with the Schedules and Exhibits attached thereto), the Scope of Work, the Contract Drawings, the Specifications and any addenda issued by Owner.

[SIGNATURE PAGE FOLLOWS THIS PAGE]

IN WITNESS WHEREOF, Contractor and Owner have executed this Trade Agreement as of the date and year first above written.

LOWER MANHATTAN DEVELOPMENT CORPORATION

By: _____
Name:
Title:

By: _____
Name:
Title:

TRADE AGREEMENT

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1. GENERAL CONDITIONS; CONTRACT DOCUMENTS

The following words and phrases have the following meanings in this Contract:

"Architect" means Peter Walker and Partners Landscape Architecture, Inc., or any successor architect designated for the Project.

"Construction Manager" means the construction manager engaged by LMDC and/or the Foundation for construction of the Memorial and/or the Memorial Museum, as identified to Contractor by Notice from LMDC or the Foundation, and any successor firm engaged by LMDC and/or the Foundation from time to time.

"Contract" or "Contract Documents" means all of the following:

- (a) this Trade Agreement, together with the annexes ("Annexes") attached hereto;
- (b) the General Conditions, together with the schedules ("Schedules") and exhibits ("Exhibits") attached thereto;
- (c) the scope of work attached hereto as Annex "6" ("Scope of Work" or "SOW");
- (d) the Contract Drawings;
- (e) the Specifications; and
- (f) any addenda issued by Owner.

"Contract Drawings" means those drawings prepared by Architect and referenced in Annex "8".

"General Conditions" means the General Conditions for Trade Contracts attached hereto.

"Owner's Representative" means a firm (if any) to be designated by Owner for such services (or a successor firm designated by Owner from time to time to provide owner's representation/project representation services).

"Specifications" means the specifications for this Contract, which form a part of, and are incorporated in this Trade Agreement, including Divisions I (General Requirements) and II (Technical Specifications), and all schedules, exhibits, annexes, attachments and other documents specified in any of the foregoing as being part of, or incorporated in, the specifications.

"Tree Holding Facility" means the location described in Section 02931 of the Specifications.

Words and phrases defined elsewhere in this Trade Agreement, in the General Conditions, or in other Contract Documents have the same meaning herein.

Annexes "1" through "10" attached hereto are part of this Trade Agreement as though fully set forth herein.

2. PRIORITY OF DOCUMENTS

Notwithstanding anything to the contrary in any of the Contract Documents, express or implied, in case of any conflict or inconsistency between or among any provisions or requirements of any of the Contract Documents, the provisions of this Trade Agreement, then the General Conditions, then the Specifications will control, in that order; and, subject to the foregoing, within the Specifications the documents forming part thereof shall have the priority (if any) set forth in the Specifications. If any of the Contract Documents conflict with or contradict any Legal Requirement (including any variances issued by Governmental Authorities), as same may be modified, the most stringent requirements shall prevail.

3. THE WORK

Upon and subject to the terms and conditions of the Contract Documents, Contractor agrees to do and perform, and furnish the Work set forth in and/or required under, and all in strict accordance with, the Contract Documents and any future changes therein; and Contractor further agrees to assume and perform all other duties and obligations imposed upon Contractor by this Contract. All Work must be in full compliance with all Legal Requirements (which includes any variances and permits issued by Governmental Authorities). Contractor warrants and agrees that the Work shall satisfy the requirements of the Contract Documents and shall (without limitation): (a) conform to the Contract Drawings and Specifications; (b) be free from fault and defects in materials and workmanship, whether latent or otherwise; (c) be of the quality required under the Contract Drawings and Specifications and, if not specified, then of first class quality and incorporate only new materials and equipment, unless the Contract Documents provide otherwise; and (d) comply with, and be constructed by means and methods complying with, Legal Requirements.

4. LUMP SUM

Upon and subject to the terms and conditions of this Contract, Owner agrees to pay to Contractor, and Contractor agrees to accept from Owner, in full consideration for the performance by Contractor of all Work and of all Contractor's duties and obligations of every kind whatsoever under this Contract and the whole thereof, a compensation of _____ dollars (\$_____) (throughout this Contract called the "Lump Sum"), and such compensation only, subject only to the express provisions of this Contract specifically setting forth actual, defined additions to or deductions from such compensation. Except as specified to the contrary elsewhere in the Contract Documents, Contractor shall bear the entire expense of all the Work, and Contractor agrees that the Lump Sum shall be Contractor's entire compensation and/or reimbursement for the performance of the Work and for all profits, costs, and expenses which will, might, or could be earned or incurred by Contractor and all Subcontractors under or by reason of the Contract; and Contractor shall perform and undertake all requirements and obligations of Contractor under the Contract Documents.

The enumeration in the Contract Documents of particular things to be furnished or done at Contractor's expense, or without cost or expense to Owner, or without additional compensation to Contractor shall not be deemed to imply that only things of a nature similar to those enumerated shall be so furnished and done; but, notwithstanding whatever obstacles or Unforeseeable Conditions which may arise or be encountered, Contractor shall perform all Work as required under this Contract for the Lump Sum without other compensation other than payments for Extra Work as specifically provided in this Contract.

5. PERFORMANCE AND PAYMENT BONDS

Prior to commencing Work, Contractor shall deliver to Owner bonds acceptable to Owner for the faithful performance of all obligations imposed upon Contractor by the Contract (the "Performance Bond") and also for the payment of all lawful claims of subcontractors, materialmen and workers arising out of the

performance of the Contract (the "Payment Bond"). Such bonds are in the form attached to the General Conditions as Exhibit "1" (both such bonds are sometimes referred to together as the "Bonds"), and are each in a penal sum equal to the Lump Sum. The Bonds shall form a part of this Contract as though herein set forth in full. Failure to deliver the Bonds to Owner within ten days of the date of this Contract shall be a material default by Contractor.

If at any time and for any reason the Bonds shall cease to be adequate security to Owner by reason of a reduction in the surety's Moody's or Standard & Poor's rating or by reason of the surety's insolvency, Contractor shall, within five days after notice from Owner so to do, substitute new Bonds in such form and sum and signed by such other sureties as may be necessary in the opinion of Owner to constitute adequate security.

6. TIME FOR COMPLETION

Contractor shall complete the performance of all Work under this Contract on or before the applicable milestone dates set forth in the Milestone Schedule in Annex "9" hereto, and shall cause the Work to be completed on or prior to the Final Completion Date, time being of the essence in each case. Contractor's obligations for the performance and completion of the Work within the time or times provided for in this Contract are of the essence of this Contract. Contractor guarantees that Contractor can and will complete the performance of the Work within the time hereinbefore stipulated or within such time or times, as extended in accordance with Article 12 of the General Conditions. (LMDC does not represent or warrant, however, that Contractor will be able to achieve such milestone dates).

7. SCHEDULE OF VALUES; LABOR RATES; SPECIAL UNIT COSTS; SPECIAL DELAY COSTS

The Schedule of Values for Contractor's work is attached hereto as Annex "2". Contractor's labor rates applicable for any and all Extra Work if, as, and when required under this Contract are attached hereto as Annex "3".

8. ROLE OF CONSTRUCTION MANAGER

Owner or the Foundation may enter into an agreement with a construction manager ("Construction Manager") to provide construction management services for construction of the Memorial and Memorial Museum. Such Construction Manager may be an agent construction manager responsible for management, coordination, supervision, and other aspects of construction or an at-risk Construction Manager performing some or all of the construction on a lump sum, guaranteed maximum price, or other at-risk basis. At Owner's election, Owner may either (a) direct Contractor to accept direction, supervision, and coordination (collectively, "Supervision") from Construction Manager or (b) assign this Contract to Construction Manager, in which event Contractor will become a subcontractor of Construction Manager and owe to Construction Manager all the duties Contractor owes to Owner under this Contract, upon and subject to the terms and conditions set forth in the form of Contract assignment attached hereto as Annex "10". If Owner directs Contractor to accept Supervision from Construction Manager, from and after the effective date specified in Owner's Notice to Contractor, Contractor shall thereafter: (i) submit to both Owner and Construction Manager copies of all documents and other submittals (including requisitions ("Requisitions")) which the Contract Documents require Contractor to submit to Owner and (ii) accept Supervision from Construction Manager with respect to scheduling, logistics, moving and location of equipment, traffic, deliveries, coordination, and all other matters relating to the Project Site and Contractor's performance of the Work. (Owner may also terminate Construction Manager's Supervision of Contractor at Owner's election upon ten (10) days Notice to Contractor.)

9. SERVICE OF NOTICES

All notices, requests, demands, elections, consents, and other communications of any kind which may or must be given under this Contract must be in writing (each, a "Notice"), delivered to the parties as follows:

- A. If to Owner, to its designated representative at the Site or at the following address:

Lower Manhattan Development Corporation
One Liberty Plaza (165 Broadway) – 20th Floor
New York, New York 10006
Fax: (212) 962-2431
Attention: Gigi Fernández
Project Manager

With a copy to Owner's Representative as follows:

[to be inserted]

- B. If to Contractor, at the following address:

[to be inserted]

- C. If to Interim Arbitrator, at the following address:

Lower Manhattan Construction Command Center
1 Liberty Plaza
New York, New York 10006
Attention: Executive Director

Any notice required by this Contract to be given or made within a specified period of time, or on or before a date certain, shall be deemed given or made only if sent (a) by hand delivery evidenced by written receipt, or (b) by registered mail, return receipt requested, and postage and registry fees prepaid. Delivery "by hand" includes commercial express or courier service or overnight delivery service. All notices shall be deemed given when received (or the date of attempted delivery if refused).

10. ORGANIZATION; AUTHORIZED REPRESENTATIVES; KEY PERSONNEL

Contractor represents and warrants that:

- (a) Contractor is a [corporation/partnership/limited liability company/joint venture] duly organized under [New York] law; and
- (b) this Contract has been approved and authorized by all necessary action on the part of the Contractor; and each of the signatories to this Contract have authority to bind the Contractor and are duly authorized to execute this Contract on behalf of Contractor.

The authorized representatives and the key personnel of the Contractor are identified in Annex "4" attached hereto.

Owner's authorized representative is _____.

Each party shall be protected fully in relying upon, or dealing with, the authorized representatives of the other party. Additional or replacement authorized representatives may be added or replaced by Notice to the other party.

LIST OF PRE-APPROVED SUBCONTRACTORS

The following subcontractors of Contractor have been approved for Work under this Contract as of the date of signing of this Contract:

[insert if any]

SCHEDULE OF VALUES

[to be proposed by Contractor and approved by Owner]

LABOR RATES

[to be proposed by Contractor and approved by Owner]

AUTHORIZED REPRESENTATIVES; KEY PERSONNEL

Authorized Representatives:

[insert]

Key Personnel:

[to be proposed by Contractor and approved by Owner]

[Intentionally Omitted]

**SCOPE OF WORK: WORLD TRADE CENTER MEMORIAL
TREE ACQUISITION, INSTALLATION AND MAINTENANCE**

NOTE: This Scope of Work is intended as a general overview. Contractor is responsible for all matters covered in this Scope of Work, the Specifications, and all other Contract Documents

PROJECT BACKGROUND

On September 11, 2001, terrorist attacks destroyed every structure on the World Trade Center site: World Trade Center office towers, commercial and government low-rise buildings, the hotel and underground concourse, Path terminal and subway stations. Almost immediately after the tragic events, a broad public consensus emerged that a fitting Memorial be created at the site and that it be the defining element of the rebuilding process. The core of the non-commercial redevelopment was defined to be the Memorial, Memorial Museum, and related cultural facilities that would draw visitors from around the world and bring new activity to this historic site.

The LMDC was created in the aftermath of September 11th to coordinate the remembrance, rebuilding, and revitalization efforts. It has completed land use, environmental, historic preservation and other required reviews. LMDC has also conducted an international design competition resulting in the selection of a winning Memorial design, *Reflecting Absence*, by architect Michael Arad and landscape architect Peter Walker.

The Foundation, in cooperation with and as designated by LMDC, is the entity responsible for the construction and subsequent operation of these facilities. The Foundation and LMDC are working closely together to ensure the project is built with the expertise, experience and resources of the best of New York's construction industry.

The building of these facilities represents an opportunity for a construction firm to play a critical role in the creation of what will be one of the country's most important and hallowed landmarks. Accordingly, it is the expectation that each firm interested in this project is prepared to put forth their absolute best people and teams. The lasting impact of this successful effort will be felt far into the future as it is projected that millions of visitors will come to Lower Manhattan each year to visit the World Trade Center site.

The Memorial that we seek to erect will ensure that future generations never forget the thousands of people who died on September 11th, 2001 in New York, in Shanksville, Pennsylvania and at the Pentagon, as well as those who died in the terrorist bombing at the World Trade Center on February 26, 1993. The Memorial Museum will tell the story of the events of September 11th, both the horror of the attacks and the heroism in their aftermath.

This Contract represents an important milestone in the mission of the Foundation and LMDC. LMDC has led the development of the project from shortly after September 11th, 2001 to today and LMDC looks forward to the transition from design to construction and continued work with the Foundation as one team dedicated to building a beautiful and respectful Memorial and Memorial Museum on sacred ground.

**I. GENERAL OVERVIEW
DESCRIPTION OF THE COMPONENTS OF THE MEMORIAL AND MEMORIAL
MUSEUM CONSTRUCTION**

The Memorial and Memorial Museum are located within the memorial quadrant. The "Memorial

Quadrant” is approximately six (6) acres of the total sixteen (16) acre World Trade Center site. The Memorial Quadrant is bounded by Fulton, Greenwich, Liberty and West Streets. The entire scope of construction of the Memorial and the Memorial Museum (of which the Work is a part) is generally composed of the following components:

1. THE MEMORIAL: REFLECTING ABSENCE

The scope of work for the Memorial will include both core and shell and fit out. The Memorial will be located at the site of the former World Trade Center. The Memorial and the Memorial Plaza contain and mark the footprints of the original Twin Towers. The predominant outdoor features of the Memorial are its landscaped plaza consisting of approximately 196,000 sf. and the two pools marking the Twin Tower footprints at 64,800 sf.

The plaza is a flat plane with high canopy trees which utilize approximately six feet of soil depth resting above a structured deck with drainage, waterproofing and irrigation systems. The two pools, edged by a thin waterfall (the "water veil") are experienced from both the plaza level and the galleries below.

The public spaces of the Memorial consist of the entry and exit ramps down from the plaza, 12 ft wide galleries (with 2 ft niches) ringing the two pools that allow open views through the water veil, the Memorial Hall that connects the two pools, and the Contemplation Room located at the lowest level of the original WTC site excavation (Bed Rock). At this same level there is a separate area for unidentified remains and Family Room. The Memorial Hall connects the north and south viewing galleries and houses support functions such as information, toilets, way-finding, security, first aid and elevators.

2. THE MEMORIAL MUSEUM

The scope of work for the Memorial Museum will include both core and shell and fit out. The Memorial Museum will have an above grade Museum Entry Pavilion connecting to the below grade Museum exhibit spaces. The entry Pavilion and Museum will be located on the western edge of the Memorial quadrant. Below grade, the Memorial Museum is bounded by the Memorial Plaza overhead, the Memorial pools and support spaces, the PATH tracks and terminal, the Chiller Plant and the slurry wall.

Directly to the north of the entry Pavilion at plaza level will be a narrow ‘ribbon’ of skylights which will allow natural light to filter over the slurry wall below. An iconic artifact will be incorporated into the design of the entry Pavilion. The entry Pavilion has been designated to house the ventilation system and mechanical equipment for the below grade Memorial, Memorial Museum program space as well as Path Program space. Vertical transportation and egress shall also be provided in the entry Pavilion. The entry Pavilion will contain an outdoor courtyard and space for visitor queuing and ticket control before descending to the Memorial Museum space below grade.

The Memorial Museum will occupy approximately 110,000 to 145,000 gross square feet of space spread out over five below grade levels.

- Level 294’ includes Lobby, Security, Visitor Services, Assembly and Administrative spaces.
- Level 284’ includes a secondary Lobby, Exhibition, Education and Support Service spaces.
- Level 270’ contains Support Spaces.
- Level 264’ includes Loading Bay and Support spaces.

- Level 242' (Bedrock) includes Exhibit and Support Spaces. The west slurry wall will be exposed and accessible at this level. In addition to the exhibit spaces, this level will also provide access to the Memorial Contemplation Room and the existing WTC box beams which define the Tower footprints.

3. WORK UNDER THIS TREES PACKAGE:

This Work includes the following work for the WTC Memorial Trees: selection, tagging, acquisition, pre-installation preparation, digging of trees, pre-installation delivery to the Tree Holding Facility, pre-installation maintenance at the Tree Holding Facility, delivery to and installation at the Project Site and post-installation maintenance at the Project Site of the WTC Memorial Trees, and all other Work required in connection with the Project and as otherwise described in the Specifications, and other contract Documents.

II. SCOPE OF CONTRACTOR'S WORK

SCOPE OF WORK – WORLD TRADE CENTER MEMORIAL

A. TREE ACQUISITION, INSTALLATION AND MAINTENANCE

Contractor will be required to provide all labor and materials to perform the following Scope of Work . The intent of this contract is to provide all labor and materials in connection with the selection, tagging, acquisition, digging, transfer, delivery, installation and maintenance of the WTC Memorial Trees. The Work as defined by the Specifications and Contract Drawings will be as indicated in the Contract Documents in the area bounded by Vesey Street to the North, West Street to the West, Liberty Street to the South, and Greenwich Street to the East. Given the nature of the Scope of the Work it is assumed that the Work will have to be accomplished in a number of phases. A milestone and phasing schedule has been provided as a guide to assist in the development of the Contractor's schedule as described in Section 01320 of the Specifications (“Contractor’s Schedule”).

General:

1. Acquisition of all required permits and approvals from Governmental Authorities having jurisdiction required to complete the Work.
2. Preparation of a CPM Schedule in accordance with Specifications.
3. Coordination with Owner and Owner's Representatives.
4. Provide all labor and materials to perform the Work.
5. Provide all required tools or other equipment in order to carry out or perform the Work.
6. Provide any or all temporary facilities, in accordance with Specifications, in order to carry out or perform the Work.
7. Provide or pay for any utilities, in accordance with Specifications in order to carry out or perform the Work.
8. Cooperate fully at all times and agree to take directives given by the Port Authority of New York and New Jersey (“PANYNJ”), the Foundation, and LMDC and their agents.
9. Understand that Contractor will not have sole possession of the Site and must cooperate fully with other contractors and their work within, on or adjacent to Site locations.
10. Understand that site access on a daily basis for large deliveries or trucking may not be available and will have to be coordinated with other contractors, the Foundation, PANYNJ, the New York City Department of Transportation (“NYCDOT”) and all other applicable regulatory agencies.
11. Selection of trees, tagging of trees, acquisition of trees, pre-installation preparation including, without limitation, boxing of trees, pre-installation delivery to the Tree Holding Facility, pre-installation maintenance at the Tree Holding Facility, the digging of the trees, the delivery of the trees to the Project Site, the installation of the trees at the Project Site, and the post installation maintenance of the trees at the Project Site in each case in accordance with the terms of the Specifications including, without limitation, Sections 02931 - 1 (Trees) thereof and 02936 – 1 (Landscape Maintenance Period for Trees) thereof.
12. Five (5) Owner Supplied Trees: Contractor will be responsible for pre-installation preparation including boxing of trees, pre-installation delivery to the Tree Holding Facility, pre-installation maintenance at the Tree Holding Facility, the digging of the trees, the delivery of the trees to the Project Site, the installation of the trees at the Project Site, and the post installation maintenance of the WTC Memorial Trees in each case in accordance with the terms of the Specifications including, without limitation, Sections 02931 -1 (Trees) thereof and 02936 – (Landscape Maintenance Period for Trees) thereof. These Owner Supplied Trees are located on Eastport Manor Road, in Eastport New York

(GPS coordinates: N40° 51' 01" W72° 44' 51"). Contact Evan Goldstein at (631) 878-6019 to arrange site visit.

B. COMPLIANCE WITH LAW/HEALTH AND SAFETY REQUIREMENTS

1. Contractor shall comply with, and ensure compliance by all persons and firms at or about the Site with, all applicable laws, statutes, regulations, ordinances, rules, common laws, decrees, orders, judgments and codes of the City and State of New York and the United States including, without limitation the Comprehensive Environmental Response, Compensation and Liability Act of 1980, the Resource Conservation and Recovery Act ("RCRA"), the Clean Water Act, the Clean Air Act, the Toxic Substances Control Act, Occupational Safety and Health Act, regulations of the New York City Department of Environmental Protection, regulations of the New York State Department of Labor, the National Emission Standards for Hazardous Pollutants Asbestos Regulations, the New York State Navigation Law, National Historic Preservation Act and the New York State Historic Preservation Act, and all variances or permits under the above, each as amended and applicable to the Site as if owned by the Foundation or a private party, whichever is more stringent, as well as other applicable Legal Requirements whether pertaining to Hazardous Materials or otherwise.
2. Contractor shall ensure that the methods of performing the Work do not involve undue danger to the personnel employed thereon, the public, and public or private property. Should charges of violation of any Legal Requirement be issued during or in connection with the performance of the Work, a copy of each charge and resolution thereof shall immediately be forwarded to the Owner. Contractor shall be responsible for all costs, fines, penalties, delays, and all other liabilities resulting from any such charges, violations, and any failure to meet this requirement.
3. Contractor shall at all times comply with, and cause all persons working or otherwise present at or about the Project to comply with, all health and safety requirements related to the Project, including but not limited to all procedures to ensure compliance with applicable Legal Requirements, including requirements and protocols established by Governmental Authorities including, but not limited to, the Occupational Safety and Health Administration (OSHA); the National Institute of Occupational Safety and Health (NIOSH); the United States Environmental Protection Agency (USEPA); the New York State Department of Environmental Conservation (NYSDEC); the State of New York, the New York State Department of Labor (NYSDOL); the New York City Department of Environmental Protection (NYCDEP); and the City of New York.
4. Contractor shall be solely responsible for identifying health and safety requirements for his/her employees and for all employees of all Subcontractors, and for ensuring the health and safety of his/her employees, the employees of all Subcontractors, and the public, which could potentially be impacted by the work of the Contractor.
5. Variances: No requests for any variance in Legal Requirements necessary or desirable to implement the Work or otherwise may be requested by the Contractor without the prior written approval of the Owner. Owner has the sole and exclusive authority to determine whether to request any variance and to determine the scope and nature of any such variance requests. Owner is under no obligation to request any variance and there shall be no increase in the Lump Sum as a result of any variance or as a result of Owner's decision not to request any variance.

6. Contractor shall be responsible for developing and implementing a Site Specific Health and Safety Plan ("SSHASP") within fifteen (15) days of the date of the Contract. Contractor shall be responsible for all aspects of the SSHASP in accordance with Section 01540 - Safe and Healthful Working Conditions, and including but not limited to the following:
- a) Completing the health and safety hazard analysis and risk assessment,
 - b) Establishing and implementing engineering controls,
 - c) Establishing and implementing administrative controls and work practices,
 - d) Providing all necessary Personal Protective Equipment (PPE) and safety equipment and conducting and ensuring completion of all required medical testing and assessments,
 - e) Control of access to Contractor's work areas,
 - f) Conducting all required and necessary tool box and safety meetings,
 - g) Establishing a training program, providing necessary training, and ensuring all workers comply with training requirements,
 - h) Hazard communication,
 - i) Accident prevention, investigation, reporting, and follow-up,
 - j) Medical surveillance, and
 - k) Documentation.

C. PLANS AND SUBMITTALS

Contractor's attention is directed to the specific Submittal Requirements of this project including, without limitation, those defined in Sections 02931 (Trees) and 02936 (Landscape Maintenance Period for Trees).

D. AUTHORITY TO STOP WORK

Governmental Authorities having jurisdiction, the Owner, the Contractor, and PANYNJ shall have the authority to stop the Work based upon violations of Legal Requirements, the SSHASP, any permits that have been issued, and/or any approved variances.

E. SITE WORK

As set forth in the Specifications.

F. ADDITIONAL CONDITIONS AND PRECAUTIONS

In order to further minimize the effects of the Work on surrounding areas, the Contractor shall:

- 1. Limit unnecessary idling of diesel-powered engines on Site.
- 2. In accordance with applicable Legal Requirements and the provisions of this Contract, control dust related to construction site through a dust control plan that includes among other things:
 - a. Use of clean water as a suppressing agent during construction activities, i.e. misting, sprinkling, etc.;

- b. A dust abatement program at grade where roll-off containers and trucks are loaded;
 - c. All trucks leaving the site having tarps or other means of mitigating dust which might blow off of the debris during transit;
 - d. Adjustment for meteorological conditions as appropriate.
3. Use best efforts to schedule activities to avoid or minimize adverse impacts on surrounding areas.
 4. Use best efforts to coordinate activities with other construction projects in surrounding area to minimize impact.
 5. Cooperate with Owner and PANYNJ efforts in the coordination of Lower Manhattan construction, including attendance at meetings of the Memorial Foundation and the Lower Manhattan Construction Command Center.
 6. Cooperate with Owner to develop a plan acceptable to the community to address issues relating to working hours.
 7. At Owner's request, cooperate with, and participate in, public outreach and information sessions.
 8. At Owner's request, assist Owner in communicating with NYCDOT and other state, local and federal agencies.
 9. Use best efforts to reuse materials and resources in accordance with the Contract Documents.
 10. Use best efforts to promote environmentally-friendly operations and maintenance.
 11. Use best efforts to conserve water in accordance with the Contract Documents.
 12. Removal and legal disposal of all debris.
 13. Temporary enclosures and personnel safety measures.
 14. Clean Up.
 15. Compliance with all applicable Legal Requirements including those of the LMDC & PANYNJ.

G. VERIFICATION OF INFORMATION

The Contractor is advised that the information shown on any drawings or sketches provided by LMDC or other parties is not guaranteed to be correct. Contractor is advised that it is Contractor's responsibility to inspect the Project to determine the accuracy of any such drawings or sketches.

H. LABOR REQUIREMENTS

This Contractor shall be responsible for all costs associated with labor

required by collective bargaining agreement within the New York City area as stipulated through the trade associations or unions that have jurisdiction rights to this project. This shall include all overtime, shift time, and differential costs associated with each trade.

Labor requirements for this Project shall include, but not be limited to the following:

Teamsters
Operating Engineers
Master Mechanics
Shop Stewards
Electricians
Plumbers
Carpenters
Laborers
Gardener/Grower
Groundsperson
Tree Remover/Pruner
Landscape Sprayer (Pesticide Applicator)

- I.** All costs associated with temporary facilities, utilities, communications, cell phones, offices, trailers, etc. shall be the responsibility of Contractor.
- J.** This Contractor shall be responsible for all labor harmony and associated costs to maintain proper labor jurisdiction on the trades performing the Work. Contractor is advised that it must maintain labor harmony throughout the duration of the Project. All labor disputes, slowdowns, strikes and/or sympathy actions shall be the sole responsibility of the Contractor to resolve in order to maintain labor harmony.
- K.** It shall be the Contractor's responsibility to resolve all labor disputes immediately. Failure to resolve such incidents action and inactions which obstruct the work and impact the Project Schedule shall be considered a breach of contract which may result in termination as per the conditions set forth in this Contract.
- L.** WORK UNDER OTHER CONTRACTS
 - 1. Cooperate fully with separate contractors so work on those contracts may be carried out smoothly, without interfering with or delaying work under this Contract. Coordinate the Work of this Contract with work performed under separate contracts. This includes Contractor's mandatory attendance at all Project meetings by senior management authorized to make all decisions on the Contractor's behalf.
 - 2. LMDC may elect to award additional contracts during the period or duration of this Contract. Contractor is expected to cooperate fully with any additional contractor which may need access to the Site to perform their work.
- M.** USE OF PREMISES
 - 1. No onsite parking shall be allowed. Contractor will make other arrangements for site access for all employees.

2. Driveways and Entrances: Keep all access to the site clear for emergency vehicles at all times. Do not use these areas for parking or storage of materials.
3. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.
4. Contractor will be required to acquire and pay for all permits from PANYNJ for access of all construction personnel and vehicles on to the Site.

N. WORK RESTRICTIONS

1. All Work shall be done during Normal Working Hours unless the Contractor requests authorization to do Work in other than Normal Working Hours and such authorization is granted by LMDC. If other than Normal Working Hours are authorized by LMDC, the Work shall be done at no additional cost to LMDC. Any and all associated costs for after hours work, including operating engineers, teamsters, master mechanics, electricians, shop stewards, plumbers, carpenters, laborers, gardeners/ growers, groundspersons, tree removers/ pruners, landscape sprayers, etc., including all costs for project supervision by the owner's Representative shall be borne by the Contractor. For purposes of this Contract, "Normal Working Hours" means 7:00 a.m. to 4:00 p.m., Monday through Friday, at times for which the Contractor has received the applicable work permits, but not on any New York State or Federal legal holiday or September 11.
2. Contractor should include all costs associated with meeting the completion schedule date requirements (i.e. extended shifts, 2nd shifts, weekends, holidays) due to areas of work not being available at any given time. Contractor will be directed to work in areas as they become available.
3. Holidays are as follows:
 - a) New Years Day
 - b) Memorial Day
 - c) Independence Day
 - d) Labor Day
 - e) Thanksgiving Day
 - f) Day after Thanksgiving Day
 - g) Christmas Eve
 - h) Christmas Day
 - i) New Years Eve
 - j) Consult with the City of New York for construction embargos or street closings.
 - k) Owner shall impose a moratorium on Work creating excessive noise/vibrations during school testing days each year. Contractor shall factor this into the Project schedule and any such moratorium shall not constitute an Excusable Delay.

O. COORDINATION

1. Contractor is responsible for closely coordinating all activities through the various entities working in and or around the Site, including PANYNJ and Silverstein including, but not limited to, the following:
 - a. contractor's mandatory attendance at all project meetings, by senior management authorized to make all decisions on Contractor's behalf; and

- b. Taking direction and mobilizing work in areas as they become available, whether convenient to Contractor or not, in best efforts to achieve Final Completion within the schedule parameters.

APPROVED BID FORM

[to be attached]

CONTRACT DRAWINGS

[insert list]

MILESTONE SCHEDULE

Milestones – Selection, tagging, acquisition, digging, transfer, delivery, installation, and maintenance of the WTC Memorial Trees

Notice of Award / Notice to Proceed	08/11/06
Commence Work Zones 1, 2 & 3	Fall, 2006
Commence Work Zone 4	Fall 2007
Installation of Zone 1 Trees	March, 2009
Installation of Zone 2 Trees	10/15/08 – 11/15/08
Installation of Zone 3 Trees	June, 2009
Installation of Zone 4 Trees	July, 2010
Maintenance Period Zone 1 Trees	Spring 2009 – Spring 2011
Maintenance Period Zone 2 Trees	Fall 2008 – Fall 2010
Maintenance Period Zone 3 Trees	Spring 2009 – Spring 2011
Maintenance Period Zone 4 Trees	Spring 2010 – Spring 2012
Project Closeout	Spring 2012

FORM OF ASSIGNMENT TO CONSTRUCTION MANAGER

ASSIGNMENT AND ASSUMPTION (this "Assignment") made as of _____, 200__ (the "Effective Date") between the LOWER MANHATTAN DEVELOPMENT CORPORATION, a subsidiary of the New York State Urban Development Corporation, d/b/a Empire State Development Corporation, with offices at One Liberty Plaza, 20th Floor, New York, NY 10006, ("Owner"), _____, with offices at _____ ("Contractor"), and _____, with offices at _____ ("CM").

Introductory Statement

Owner entered into a Trade Agreement with Contractor dated _____, 2006 (the "Contract") covering the selection, tagging, acquisition, digging, transfer, delivery, installation and maintenance of the WTC Memorial Trees, and all other work required in connection with the Project, in connection with the construction of the Memorial and the Memorial Museum located at the site of the World Trade Center in Lower Manhattan, New York .

Section 8 of the Contract generally provides that at Owner's election, Owner may assign the Contract to Construction Manager upon and subject to the terms and conditions set forth in this Form of Assignment to Construction Manager.

On _____, 200__, Owner has entered into an agreement with CM for the management and general construction of all Work applicable to the construction of the Project (the "CM Agreement").

Owner and CM recognize the benefit of having CM control, coordinate, and be responsible for the Work under the Contract as part of CM's work under the CM Agreement. Therefore, Owner and CM desire that (i) Owner assign to CM, and CM assume from Owner, the Contract; (ii) CM shall become responsible to Owner for the Work under the Contract as part of CM's work under the CM Agreement; and (iii) Contractor shall become a Subcontractor of CM, all upon the terms and conditions set forth below.

Unless otherwise specified herein, words and phrases defined in the Contract shall have the same meanings in this Assignment.

NOW, THEREFORE, subject to the terms and conditions set forth below, for good and valuable consideration, including their respective agreements and undertakings set forth below, Owner, Contractor and CM agree as follows:

1. Assignment. Owner hereby assigns to CM the Contract, and all of Owner's right, title and interest therein, subject to the Reserved Rights described in paragraph 3 below.
2. Assumption. CM agrees to assume, perform and be responsible, as part of CM's work under the CM Agreement and pursuant to the CM Agreement: (i) for the benefit of Owner, all of the obligations of the Contractor, under the Contract, (ii) for the benefit of the Contractor all of

Owner's obligations under the Contract; and in each case of (i) and (ii) whether arising or accruing before, on, or after the effective date; and Owner, CM and Contractor agree that, subject to paragraph 4, Contractor shall be deemed an approved Subcontractor of CM for all purposes of the CM Agreement; and the entire Scope of Work of Contractor under the Contract shall now be added to the scope of work of CM under the CM Agreement; and the Lump Sum amount under the Contract shall be added to the lump sum amount or guaranteed maximum price under the CM Agreement.

3. Reserved Rights. Owner shall remain a third party beneficiary of the rights previously held by Owner under the Contract (the "Reserved Rights"). Owner shall not exercise the Reserved Rights in a manner that would negate the respective rights that either CM or Contractor has under the CM Agreement or Contract, respectively.
4. How Conflicts Resolved. If and to the extent that there is any conflict between the provisions of the Contract and those of the CM Agreement, then:
 - (a) with respect to the obligations of the Contractor to Owner and/or CM, the terms of the Contract shall govern; and
 - (b) with respect to the obligations of the CM to Owner, the terms of the CM Agreement shall govern, except that those provisions dealing with the Scope of Work of the Contractor shall be governed by the Contract.
5. Insurance and Bonds.
 - (a) The insurance coverages required to be provided to Owner under the Contract shall continue in effect in compliance with Schedule "G" to the General Conditions of the Contract, although CM will now also be added as an additional insured under such coverages.
 - (b) The insurance coverages required to be provided to Owner by CM under the CM Agreement shall now apply also to the obligations of CM and the Contractor under the Contract.
 - (c) CM's bonds shall also cover the Contractor as a subcontractor of CM.
6. Representations.
 - (a) Owner represents and warrants that Owner has not previously assigned or otherwise transferred the Contract and that execution and delivery of this Assignment has been duly authorized by all necessary action.
 - (b) CM represents and warrants that it has received and read the original or a copy of the Contract and that execution and delivery of this Assignment has been duly authorized by all necessary action.
 - (c) Contractor represents and warrants that execution and delivery of this Assignment has been duly authorized by all necessary action.
7. Miscellaneous. This Assignment shall be governed by, interpreted under, and construed and enforced in accordance with the laws of the State of New York. This Assignment shall be binding upon and inure to the benefit of the parties hereto and their respective successors and

assigns. This Assignment may be executed in counterparts, each of which shall be deemed an original, and all of which together shall constitute a single instrument. This Assignment shall not be modified, waived, or amended except by written agreement executed by Owner and CM.

[SIGNATURE PAGE FOLLOWS THIS PAGE]

IN WITNESS WHEREOF, the undersigned have executed this Assignment as of the date written above:

LOWER MANHATTAN DEVELOPMENT CORPORATION.

By: _____
Name:
Title:

By: _____
Name:
Title:

By: _____
Name:
Title:

2

GENERAL CONDITIONS
FOR TRADE CONTRACTS

with

LOWER MANHATTAN DEVELOPMENT CORPORATION

World Trade Center Memorial

TREE ACQUISITION, INSTALLATION AND MAINTENANCE

New York, NY

dated as of

_____, 2006

GENERAL CONDITIONS

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GENERAL CONDITIONS

CHAPTER I

GENERAL PROVISIONS

1. DEFINITIONS

The following words and phrases whenever they occur in this Contract or any of the other documents forming a part of the Contract shall be construed as follows:

"Allowance" means a specific amount included within the Lump Sum for the costs of certain Extra Work specified in such allowance. If Owner issues a Change Order for Extra Work to be charged to an Allowance, Contractor's compensation for such Extra Work shall be priced in accordance with Article 7 hereof and charged to the Lump Sum to the extent of such Allowance. If Contractor is entitled to compensation for Extra Work beyond that which is provided in the Allowance, then extra payment will be made for the difference between such amounts, upon the terms and conditions for payment of Extra Work. In every other respect, the provisions of this Contract with respect to Change Orders and Extra Work apply to Work performed on an Allowance basis.

"Certificate of Final Completion" is defined in Article 28.

"Change Order" or "change order" means a written change order issued by Owner authorizing Extra Work pursuant to Article 22 hereof upon and subject to the terms and conditions of this Contract.

The terms "construction site," "Site," "Site of the Work," "Project Site," "project site," or words of similar import shall mean the World Trade Center site in Lower Manhattan, New York bounded by Church Street, Liberty Street, Vesey Street and West Street.

"Contract" is defined in the Trade Agreement. The Contract as so defined shall constitute the complete and exclusive statement of the terms of the agreement between the parties.

"Contract Documents" is defined in the Trade Agreement.

The term "days" or "calendar days" in reference to a period of time shall mean consecutive calendar days, Saturdays, Sundays and holidays, included.

The term "delay" means any and every delay, obstruction, hindrance, interference, loss of efficiency, and/or loss of productivity or inefficiency of any kind.

"Documents" or "documents" are defined as documents, records, books, papers, contracts, memoranda, invoices, correspondence, notes, photographs, drawings, charts, graphs, other writings, recording tapes, recording discs, mechanical or electronic information storage or recording elements (including any information stored in or on a computer hard drive, computer memory or website).

"Environmental Laws" means any federal, state or local law, statute, regulation, ordinance, rule or common law, decrees, orders, judgments or other Legal Requirements relating to pollution or protection of the environment, natural resources or public health, safety and welfare including those pertaining to land use, the release or threatened release of Hazardous Materials, exposure to Hazardous Materials, or generation, use, storage, treatment, disposal, transportation or remediation of Hazardous Materials, including, *inter alia*, the Comprehensive Environmental Response, Compensation and Liability Act of

1980, the Resource Conservation and Recovery Act ("RCRA"), the Clean Water Act, the Clean Air Act, the Toxic Substances Control Act, Occupational Safety and Health Act, regulations of the New York City Department of Environmental Protection, regulations of the New York State Department of Labor, the National Emission Standards for Hazardous Pollutants Asbestos Regulations, the New York State Navigation Law, National Historic Preservation Act and the New York State Historic Preservation Act, each as amended and applicable to the Site as if owned by a private party.

"Excusable Delay" means any delay in the Work resulting from any cause if such cause is beyond Contractor's reasonable control and was not caused by Contractor's error, mismanagement, fault or neglect. Subject to the foregoing, an Excusable Delay shall include any delay caused by: (a) fire, earthquake, explosion, landslide, lightning or flood; or other acts of God; (b) adverse weather not reasonably anticipated; (c) Extra Work; (d) riots or civil disturbance; (e) epidemic; (f) strikes (other than a strike caused by, or within the control of, Contractor or any subcontractor); (g) lockouts by persons other than Contractor or any subcontractor; (h) acts of terrorism; enemy action, or war; (i) blockades; (j) Unforeseeable Conditions; (k) acts or omissions of Owner; (l) the delay of any Governmental Authority in issuing any permits necessary to perform any Work; provided that Contractor uses commercially reasonable efforts to secure all such permits and does not contribute to the failure of the Governmental Authority to timely issue any such permits; (m) changes in Legal Requirements after the signing of this Contract; (n) delays occasioned as a result of coordination with, or operations of, PANYNJ and Silverstein in the Site; and (o) any other causes beyond Contractor's reasonable control. However, notwithstanding the foregoing, "Excusable Delay" shall not include any delay resulting from (i) uncovering, removal, replacement or repair of defective or incorrect Work previously performed by or under the direction of Contractor; (ii) Work required by reason of Contractor's fault; (iii) any delay occurring during any period when any policy of required insurance or Bonds to be secured and maintained by Contractor are not in effect; (iv) Contractor's failure to place timely orders for delivery of materials, equipment or services; (v) Contractor's failure to perform or to take any action with reference to the Work which by industry practice is an obligation of the Contractor or its subcontractors; (vi) any other loss of time resulting from Contractor's error, mismanagement, fault, or neglect; (vii) Contractor's failure to employ an adequate construction force (number and quality); or (viii) any delay occurring during the period that follows Contractor's failure to submit a complete draft of the Contractor's Schedule within thirty days of the date of the notice of award until the time that the Contractor's Schedule has been approved. References to "Contractor" in this definition will also mean and include all "subcontractors" and "Materialmen."

"Extra Work" means Work required by Owner pursuant to Article 22 hereof which adds scope or program to the Scope of Work. For the avoidance of doubt, "Extra Work" does not include (a) development of details reasonably inferable from or implied by, but not explicit in, the Contract Documents (and taking into account Contractor's prior review of the same); (b) the inclusion or exclusion of any item which should be included or excluded in accordance with good construction practice, whether or not shown or set forth in a Contract Drawing or Specification; (c) any work required to coordinate with or accommodate the operations of PANYNJ and/or Silverstein, or other contractors at the Site; or (d) any matters resulting from, or attributable to, mistake, error, omission, delay, or negligence of Contractor or any of its subcontractors.

"Final Completion" means the time when a Certificate of Final Completion is issued pursuant to Article 28 hereof.

"Final Completion Date" means May 15, 2012, subject to extensions of time for Excusable Delay pursuant to this Contract.

"General Conditions" means these General Conditions for the Contract. Schedules "A" through "G" and Exhibits "1" through "3" attached hereto are part of these General Conditions as though fully set forth herein.

"Governmental Authority" means the United States, the State of New York, PANYNJ, the City of New York, and any and every other agency, authority, department, board, bureau, court, commission, or instrumentality or political subdivision of any of the foregoing.

"HASP" means the Health and Safety Plan in effect for the Project as it may be modified from time to time (if and only if any such modification is approved by Owner) and all requirements referenced in, or incorporated by reference in, said Health and Safety Plan.

"Hazardous Materials" means any substance, pollutant, contaminant, waste or other material defined as hazardous or toxic and regulated as such under any Environmental Law, including asbestos.

"Integrity Monitor" means Stier Anderson LLC (or a successor firm designated by Owner from time to time to provide integrity monitoring services).

"Interim Arbitrator" means the present Director of the Lower Manhattan Construction Command Center and any successor in that office. If the Director of the Lower Manhattan Construction Command Center is unable to act as Interim Arbitrator, the Interim Arbitrator shall be a person approved by Owner.

"Legal Requirement" or "Law" or "law" means (a) any statute, ordinance, code, law, rule, regulation, permit, agency notice or order, approval, consent decree, order or other written requirement, standard or procedure enacted, adopted or applied by any Governmental Authority, or any administrative or judicial interpretation thereof, together with all related amendments, implementing regulations, and reauthorizations including any judgment, writ, order, injunction, award or decree of any court, judge, justice or magistrate, including any arbitrator in any binding arbitration; (b) for the avoidance of doubt, all Environmental Laws; (c) any binding judgment, writ, order, injunction, award or decree of any court, judge, justice, magistrate, administrative agency or other governmental authority (or of any arbitrator in any binding arbitration), implementing, applying or otherwise relating to any item included in clause (a) above; and (d) any variances issued by Governmental Authorities. As used in this Contract, actions taken "in order to comply with any Legal Requirement," or actions "necessary to comply with any Legal Requirement" shall include actions taken in order to meet a Legal Requirement in the absence of a written order or other such directive mandating such actions. For the avoidance of doubt, as set forth elsewhere in this Contract, the Project requires Contractor to comply with all Legal Requirements in undertaking and completing the Work and all means and methods relating thereto. However, additional work required by changes in Legal Requirements that occur after the execution of this Contract by Contractor shall be deemed Extra Work for purposes of Articles 7 and 22 below and other applicable provisions of the Contract.

"Lump Sum" is defined in Article 4 of the Trade Agreement.

"Materialman" or "materialman" means anyone who furnishes materials, plant or equipment (including temporary or consumable materials) to Contractor or any subcontractor for use at or about the construction site in the performance of Work. "Materialman" or "subcontractor," however, shall exclude Contractor or any subsidiary or parent of Contractor or any Person which has a substantial interest in Contractor or in which Contractor or the parent or the subsidiary of Contractor, or an officer or principal of Contractor or of the parent or the subsidiary of Contractor has a substantial interest, provided, however, that for the purpose of Article 25 hereof the exclusion in this paragraph shall not apply to anyone but Contractor itself.

"Notice" or "notice" means a written notice.

"PANYNJ" means the Port Authority of New York and New Jersey.

"Person" or "person" means an individual person, a corporation, partnership, limited liability company, trust, joint venture, proprietorship, estate, government entity, or other incorporated or unincorporated enterprise, entity or organization of any kind whatsoever.

The phrase "reasonably inferable" means that an experienced contractor in the applicable industry or trade would reasonably believe that an item of Work (whether or not specifically delineated) was required by the particular Document in accordance with good practice, standard procedures, or customary expectations of or in such industry or trade.

"RFI" means a request for information issued by Contractor to Owner or Architect or vice-versa.

"Scope of Work" or "SOW" means the Scope of Work attached as Annex "6" to the Trade Agreement.

"Shop Drawings" means all drawings, diagrams, illustrations, schedules, including supporting data, which are specifically prepared for this Contract and submitted by Contractor pursuant to the requirements of the Specifications or Owner to illustrate some portion of the Work. The terms "shop drawings", "placing drawings" and "working drawings" are used interchangeably in this Contract.

"Silverstein" means Silverstein Properties Inc. and/or Persons owned or controlled by, or in contract with, Silverstein Properties, Inc.

"Specifications" are defined in the Trade Agreement.

"Subcontractor" or "subcontractor" means any Person who performs Work (other than or in addition to the furnishing of materials, plant or equipment) at or about the construction site, directly or indirectly (i.e., of whatever tier) for or in behalf of Contractor (and whether or not in privity of contract with Contractor), but shall not include any person who furnished merely their own personal labor or their own personal services or who performs Work which consists only of the operation of construction equipment of which they are the lessor. References to "Contractor" in this Contract (whether or not so stated or implied) shall be deemed to include all subcontractors and Materialmen and their employees unless specifically provided otherwise.

"Unforeseeable Conditions" or "unforeseeable conditions" means any and all covered or otherwise latent or hidden and materially adverse conditions (including Hazardous Materials) existing in or around the Site which: (i) are not actually known to Contractor; (ii) would not be reasonably foreseeable by any Person experienced in Contractor's trade or industry undertaking work of the type involved in the particular location, circumstances, and conditions by visual observation of reasonably observable conditions or by review of the Contract Documents, Specifications, or other documents previously furnished to Contractor; and (iii) were not disclosed in any Contract Documents, Specifications, or other documents previously furnished to Contractor by Owner, Architect, or any other Person.

"Work" means all structures, equipment, plant, labor, materials and other facilities and all other things necessary or proper for, or incidental to, performing the services required under the Contract Documents and otherwise in compliance with the requirements of this Contract. "Work" shall include the furnishing of all labor, services, equipment, forms, transportation, insurance, temporary facilities, and other things and services of every kind for the full performance and completion of all of Contractor's obligations under

this Contract, including documentation and record-keeping requirements; and "performance of Work" and words of similar import shall mean the furnishing of such facilities and the doing of all such things.

"Work required by the Contract Documents" or words of similar import shall include all Work required by the Contract Documents in their present form (whether or not mentioned in the Contract Documents), and all Work involved in or incidental to the accomplishment of the results required by the Contract Documents in its present form and/or reasonably inferable therefrom (whether or not mentioned therein or shown thereon).

"Work Day" or "Work day" means a day other than a Saturday, a Sunday, a New York State or Federal legal holiday, or September 11th.

"Worker" or "worker" means any employee of Contractor or of a subcontractor who performs personal labor or personal services at the construction site.

Whenever they refer to the Work or its performance, "directed," "required," "permitted," "ordered," "designated," "prescribed" and words of similar import shall mean directed, required, permitted, ordered, designated or prescribed by Owner, PANYNJ, or Architect (as applicable); and "approved," "acceptable," "satisfactory" and words of similar import shall mean approved by or acceptable or satisfactory to Owner, PANYNJ, or Architect (as applicable); and "necessary," "reasonable," "proper," "correct" and words of similar import shall mean necessary, reasonable, proper or correct in the judgment of Owner, PANYNJ, or Architect (as applicable), upon and subject to other terms and conditions of this Contract (including Articles 7 and 22 hereof).

Whenever "including," "include," "such as" or words of similar import are used, the specific things thereafter enumerated shall not limit the generality of the things preceding such words and shall be construed to mean, also, "without limitation".

Certain other words and phrases are defined elsewhere in the Contract Documents and other parts of the Contract and these General Conditions and (unless otherwise specified) have the same meanings throughout the Contract.

2. GENERAL PROVISIONS REGARDING THE WORK

The enumeration in this Contract and in the Contract Documents of particular things to be furnished or done at Contractor's expense, or without cost or expense to Owner, or without additional compensation to Contractor shall not be deemed to imply that only things of a nature similar to those enumerated shall be so furnished and done; but, notwithstanding whatever obstacles or Unforeseeable Conditions may arise or be encountered, Contractor shall perform all Work as required under this Contract for the Lump Sum without extra compensation other than payments for Extra Work as specifically provided in this Contract.

Contractor acknowledges that the installation of the Work involves coordination with the Owner and other contractors that may be working at the site. Contractor understands that such coordination may require periodic delays, and phased installation, and has provided for the same in the Lump Sum and in Contractor's schedule, upon and subject to the terms and conditions of this Contract.

Contractor will at all times comply with the HASP and cause all employees of Contractor and all subcontractors entering on or working in or around the Project site to comply with the HASP.

Contractor shall not seek any variances from any Legal Requirements without Owner's prior written approval. Owner has the sole and exclusive authority to determine whether to request any variance and to

determine the scope and nature of any such variance requests. Owner is under no obligation to request any variance and there shall be no increase in the Lump Sum as a result of any variance or as a result of Owner's decision not to request any variance.

Contractor acknowledges that Contractor has had ample time to review to Contractor's satisfaction the Contract Documents; and Owner makes no warranty or representation whatsoever, express or implied, as to the feasibility, constructability or suitability of the Contract Documents.

Contractor warrants and agrees that the Work shall satisfy the requirements of the Contract Documents and shall (without limitation): (a) conform to the Contract Drawings and Specifications; (b) be free from faults and defects in material and workmanship whether latent or otherwise; (c) be of the quality required under the Contract Documents and, if not specified, then of first class quality and incorporate only new materials and equipment unless the Contract Documents provide otherwise; and (d) comply with, and be constructed by means and methods complying with, Legal Requirements.

Contractor agrees that amounts received by Contractor from Owner shall be held in trust in accordance with the New York Lien Law and shall be used first (i.e., before application for any other purpose) to pay for labor, materials, services, or equipment furnished in connection with the Work, or any portion thereof, and for premiums on the Bonds and insurance policies required to be maintained by Contractor.

Unless specified to the contrary in other provisions of the Contract, Contractor shall perform the Work in a good and skillful manner in accordance with current good standards of industry practice and shall supervise, direct and coordinate all portions of the Work competently and efficiently. Contractor shall have exclusive responsibility for all applications, means, methods, techniques, sequences, and procedures necessary or desirable for the correct, prompt, and orderly prosecution and completion of the Work as required by the Contract, subject, however, to Owner's right to reject means and methods proposed by Contractor which: (a) will constitute or create a hazard to the Work or to persons or property; (b) do not comply with Legal Requirements and/or (c) will not result in Work in accordance with the requirements of the Contract Documents. Approval of (or failure to reject) any of Contractor's means and methods of construction for the reasons specified in (a), (b), or (c) above shall not relieve Contractor of any obligations under the Contract or entitle Contractor to any adjustment of the Lump Sum.

3. ACCESS TO RECORDS; OWNERSHIP OF DOCUMENTS

Contractor shall keep and maintain at Contractor's office the following (the "Books and Records"):

- A. complete accounts and cost records of all payments by Owner to Contractor and/or by Contractor to any subcontractor or other person in connection with the Work, including records of all Extra Work performed;
- B. copies of all documents of any kind prepared, issued, or received by Contractor in connection with the Work or the Project including all Contract Documents, bulletins, requests for information, bonds, subcontracts, purchase orders, correspondence (including correspondence with government entities or relating to funding), claims, anticipated cost reports, shop drawings, change orders, change order logs, handbooks, warranties, guarantees, operating manuals, rate manuals, technical standards and specifications, instructions, permits, licenses, certificates, inspection/investigation reports, notices of lien, certifications of "Prevailing Rate of Wage," documents served in legal proceedings, and insurance documentation;

- C. all books of account, bills, vouchers, invoices, payroll records, receiving documents, time books, job diaries and reports, cost analyses, cancelled checks, sales or excise tax filings and returns (or exemptions therefrom), other government filings, and other documents showing acts or transactions in connection with (or relating to or arising by reason of) the Work, this Contract, or each subcontract;
- D. samples received;
- E. Project schedules (and all revisions thereof);
- F. photographs and/or a video record of the Work (if and as required under the Specifications);
- G. environmental samples, test results, laboratory data, and any and all other similar information; and
- H. written policies and procedures; subcontract files (including proposals of successful and unsuccessful bidders, bid recaps, etc., for the Project); original estimates; estimating work sheets; change order files (including documentation covering negotiated settlements); backcharge logs and supporting documentation; general ledger entries detailing cash and trade discounts earned; credits, rebates and refunds of any kind and type whatsoever including without limitation equipment rental rebates, insurance rebates and dividends; and any other Contractor records which may have a bearing on matters of interest to Owner in connection with the Work.

The Books and Records shall be open to inspection and subject to audit and/or reproduction at any time upon reasonable notice, except in an emergency, during normal business hours by Owner and its authorized representatives to the extent necessary to adequately permit evaluation and verification of Contractor's compliance with all terms, conditions, obligations and requirements of the Contract and compliance with provisions for pricing and submitting Change Orders, invoices and claims submitted by the Contractor or any of its payees. In those situations where Contractor's records have been generated from computerized data (whether mainframe, mini-computer, or personal computer based computer systems), Contractor agrees to provide Owner's representatives with extracts of data files in computer readable format on data disks or suitable alternative computer data exchange formats.

Contractor shall require all Subcontractors and other payees (including material suppliers and subconsultants) when working under any type of contract (including lump sum agreements, unit price agreements, time and material agreements, cost plus agreements or lump sum major material purchase orders) to comply with the provisions of this Article by insertion of the requirements hereof in the written agreement between Contractor and such payee. Such requirements shall include flow-down audit provisions in substantially the same form as in this Article.

Contractor shall cooperate fully and shall cause all of Contractor's payees to cooperate fully in furnishing or in making available to Owner from time to time whenever requested in an expeditious manner any and all such information, materials and data required by this Article.

Owner or its authorized representatives shall have access to Contractor's facilities, shall be allowed to interview all current or former employees to discuss matters pertinent to the performance of this Contract, shall have access to all necessary Documents, and shall be provided adequate and appropriate work space, in order to conduct audits in compliance with this Article.

All plans, drawings, specifications, reports, tests, and other documents of any kind, and all samples, shop drawings, and other submittals, prepared by Contractor or any subcontractor (including any licensed engineer or other licensed professional engaged by Contractor for any aspect of this Project) in connection with the Work, together with all other Books and Records, and all rights in the foregoing (including rights of use, copyright, and trademark), shall be and remain the sole and confidential property of Owner (whether or not Owner undertakes, terminates, or completes the Work, or this Contract is terminated for any reason whatsoever, with or without cause, and regardless of any disputes between the parties); and, for the avoidance of doubt, Contractor hereby irrevocably and unconditionally assigns all the foregoing to Owner. Submission or description of any document (whether or not authorized) described in the foregoing sentence to any person or Governmental Authority for purposes of, or in connection with, the Work shall not be construed as publication in derogation of Owner's rights under this Contract (but this sentence shall not be construed to authorize any submission or description of a document other than as permitted by this Contract).

As a part of and a condition to the issuance of the Certificate of Final Completion (or upon any earlier termination of this Contract by either Owner, or Contractor for any reason whatsoever or at any other time at Owner's request for any reason), Contractor shall deliver to Owner a complete set of the Books and Records. Upon prior notice to Owner from time to time, Contractor shall have access for six (6) years to the Books and Records which are stored by Owner after completion of the Work under this Contract.

No provision in this Contract giving Owner a right of access to records and documents is intended to impair or affect any right of access to records and documents which Owner would have in the absence of such provision.

In the event that any audit pursuant to this Article discloses overcharges by Contractor or any Subcontractor with respect to the total amount requisitioned by Contractor for any particular month and paid by Owner, Contractor shall reimburse Owner upon demand for Owner's reasonable costs of conducting the audit that disclosed such overcharges; and Contractor shall also repay to Owner upon demand the full amount of any such overcharge. (Alternatively, Owner may, in its sole discretion, take a credit against amounts next becoming due and payable to Contractor for the amount of any such overcharge and for the reasonable expenses of conducting such audit.)

For purposes of this Article, references to "Owner" shall be deemed to include LMDC, the Foundation, the Owner's Representative, PANYNJ, the Integrity Monitor and other auditors, the United States Department of Housing and Urban Development ("HUD"), and their authorized representatives.

For the avoidance of doubt, each subcontractor shall also be subject to and bound by the provisions of this Article.

4. EXEMPTION FROM NEW YORK SALES TAXES

Owner, a public benefit corporation, is exempt from the payment of New York State and City sales and use taxes, as provided in the New York Tax Law (the "New York Tax Law").

Owner hereby delegates agency authority to Contractor for the purchase of any materials, equipment or supplies, or the rental of any equipment, required for the performance of the Work, and Contractor hereby expressly consents and accepts such agency appointment.

Owner will provide Contractor with an exempt organization certificate to comply with the provisions of the New York Tax Law. Contractor shall furnish all subcontractors and other vendors with Owner's exempt organization certification.

All purchase orders to be issued for the purchase of materials, equipment, and supplies or to be issued for the rental of equipment required to perform the Work shall clearly state that Contractor is acting as the agent of the Owner and shall specifically identify Owner as the exempt organization purchaser. Further, the purchases shall be billed or invoiced by the vendor to Owner or to the Contractor as agent for Owner.

All property purchased for the Work by Contractor or its subcontractor as agent for the Owner shall become property of Owner upon such purchase, and title to such property shall at no time vest on the Contractor or any subcontractor.

The delivery of all materials, equipment and supplies shall be made to the Site; or under certain circumstances (such as where the materials require additional fabrication before installation on the Site or for storage to protect the materials from theft or vandalism prior to use at the Site) deliveries of such materials, equipment and supplies may be made to a place other than the Site, providing the ultimate delivery of such materials, equipment and supplies is made to the Site. Where delivery is made to a place other than the job site, the purchases must be billed or invoiced by the vendor to Owner or to Contractor as agent, identify the place of delivery, Owner's full name and address and the Site location where the materials will ultimately be delivered for installation.

The agency created in this Article shall continue until terminated by Owner. Such termination shall be effective after three days written Notice, in which event neither the Contractor nor any subcontractor shall represent itself as agent for the Owner, and all subsequent purchase orders shall be modified accordingly. The agency created in this Article is limited to its terms and shall not be construed as having any broader meaning. Any materials, equipment and supplies purchased, rented or leased pursuant to this agency shall be deemed part of the "Work" for purposes of this Contract. This agency shall not be deemed an authorization by Owner to Contractor to purchase, rent or lease or provide any materials, equipment, tools, or services, except those required for the Work pursuant to this Contract.

5. COORDINATION WITH OTHER CONTRACTORS OF OWNER

Owner shall not be liable for any damages suffered by Contractor by reason of the failure or refusal of any other contractor of Owner (or its subcontractor) promptly to comply with the directives issued by Owner or any construction manager related to coordination or scheduling of the work, including acceleration. Should Contractor sustain any damage resulting from any such failure or refusal of another contractor of Owner, Contractor agrees to have no claim against Owner for such damage but shall have a right to recover such damage from the contractor at fault. Contractor further agrees to accept liability and responsibility to pay for any costs or damages sustained by any other contractor of Owner on the Project arising out of Contractor's failure or refusal to comply with directives issued by Owner related to coordination or scheduling, including acceleration. Similar provisions establishing the right to recover damages for failure or refusal to comply with the directives of Owner as set forth above shall be contained in each of Owner's contracts or subcontracts for the Project.

CHAPTER II

ADJUSTMENTS AND PAYMENTS

6. DELETED WORK

If any Work required by the Contract Documents in their present form shall be deleted or reduced, such deletion or reduction shall be reflected in a Change Order issued by Owner; and, if Contractor and Owner do not agree on the amount of the reduction in the Lump Sum by reason of such deletion or reduction, Contractor's compensation shall be reduced by an amount equal to the actual cost in money of the labor

and materials that would have been required for the deleted or reduced Work (without mark-up), netted against any compensation for Extra Work required by the same change order (for clarification, Extra Work shall be priced in accordance with Article 7; and the adjustment for deleted or reduced Work shall then be subtracted from such computation of Extra Work).

Owner shall have authority to agree in writing with Contractor for adjustments by way of reduction in the Lump Sum in lieu of those for which provision is made in the foregoing paragraph.

7. COMPENSATION FOR EXTRA WORK

Owner and Contractor may agree upon lump sum or other compensation for Extra Work in lieu of the compensation for which provision is hereinafter made in this Article.

If Contractor and Owner do not agree on a lump sum or other compensation for particular Extra Work, and the Extra Work is performed, the compensation of Contractor and the applicable subcontractor(s) shall be increased solely by an amount equal to the actual net cost in money of the labor and materials required for such Extra Work (the "Base CO Cost") plus:

- A. where the Base CO Cost is \$100,000 or less:
 - 1.) ten percent (10%) of such Base CO Cost for all general conditions costs (including all bond and insurance costs) of Contractor (inclusive of all subcontractors) for such Extra Work, plus
 - 2.) ten percent (10%) of the total of (i) the Base CO Cost and (ii) the amount computed for general conditions costs, as compensation for all overhead and profit of Contractor (inclusive of all subcontractors) for such Extra Work; or
- B. where the Base CO Cost is more than \$100,000, fifteen percent (15%) of such Base CO Cost for all overhead, profit and general conditions costs (plus, separately computed and not subject to such 15%, all bond and insurance costs) of Contractor (inclusive of all subcontractors) for such Extra Work; provided, however, that
- C. where Extra Work is covered by an Allowance, neither Contractor nor any applicable subcontractor shall be entitled to payment for bond and insurance costs applicable to such Extra Work.

In proposing a lump sum or other compensation for Extra Work for consideration by Owner, Contractor shall in any event prepare and present to Owner an estimate of the costs for such Extra Work computed pursuant to the foregoing paragraph to demonstrate the reasonableness of Contractor's proposal.

As used in this Article (and in this Article only):

"Labor" means non-salaried foremen, surveyors, laborers, mechanics and other employees below the rank of superintendent, exclusive of timekeepers, directly employed at the construction site, whether employed by Contractor or by its subcontractors, subject to Owner's approval (not to be unreasonably withheld) as to what employees of any category are "required for Extra Work" and as to the portion of their time allotted to Extra Work; and "cost of labor" means the wages actually paid to and received by such employees plus a proper proportion of (a) premiums, if any, actually paid by the employer for workers' compensation insurance upon the basis of such wages, (b) vacation allowances and union dues and assessments which the employer actually pays pursuant to contractual obligation upon the basis of such

wages, and (c) taxes actually paid by the employer pursuant to law upon the basis of such wages. "Employees" as used above means only the employees of one employer.

"Materials" means temporary and consumable materials as well as permanent materials; and "cost of materials" means the price for which such materials are sold for cash by the manufacturers or producers thereof, or by regular dealers therein, whether or not such materials are purchased directly from the manufacturer, producer or dealer (or if Contractor is the manufacturer or producer thereof, the reasonable cost to Contractor of the manufacture and production), plus the reasonable cost of delivering such materials to the construction site in the event that the price paid to the manufacturer, producer or dealer does not include delivery and in case of temporary materials, less their salvage value, if any.

The hourly rates for Contractor's own labor are given in Annex "3" to the Trade Agreement.

In reference to an item of equipment, if the particular item of equipment is actually utilized at the construction site by Contractor or subcontractors under this Contract on a Saturday, Sunday or legal holiday said day shall be deemed a Work day.

The rental for equipment, whether owned by Contractor or subcontractors or rented from others and notwithstanding the actual price of any rental or actual costs associated with such equipment, shall be computed by Owner on the basis of the following:

D.

- 1.) Hourly rental for those items of equipment listed in the "Rental Rate Blue Book" (published by Machinery Information Division, K-III Directory Corporation, 1735 Technology Drive, Suite 410, San Jose, California 95131-2398), (hereinafter called "the Blue Book") shall be 100% of the applicable rates as listed in said book, reduced to an hourly basis (see formula below) except that such applicable rates shall be reduced by 50% for all hours of rental payable hereunder in excess of 8 hours each day. The edition of this publication to be used shall be the one in effect on the date of the actual rental of the equipment. The "Estimated Operating Cost per Hour" as set forth for such item of equipment in the Blue Book shall be added to the hourly rental for each hour that such equipment is actually engaged in performing Extra Work. No amount for operating cost will be allowed during periods when such equipment is not actually engaged in performing Extra Work (i.e., standby rental time). None of the provisions of the Blue Book shall be deemed referred to or included in this Contract except as specifically set forth in this Article.
- 2.) If no listing of rental rate and/or hourly operating cost for the item of equipment is in the Blue Book, Owner shall determine the reasonable rate of rental and/or hourly operating cost of the particular item of equipment by such other means as Owner finds appropriate.

E. When utilizing the rental rates appearing in the Blue Book, Owner shall determine the applicable rate and the hourly rental determined therefrom by applying the following criteria:

- 1.) The rate to be applied for an item of equipment used on a particular Extra Work order shall be the daily, weekly or monthly rates from the foregoing publication based on the total number of Work days or portions thereof that a particular item

of equipment or substitute item of equipment is at the construction site for use by Contractor or subcontractors whether under this Contract or any other contract with Owner. Included within this period will be (i) Work days of idleness of the equipment at the construction site whether such idleness results from acts or omissions of Contractor, Owner or third persons, breakdowns in the equipment or any other cause, (ii) Work days on which the equipment is removed from the construction site solely to enable the performance of repairs thereon, and (iii) Work days intervening between the removal of equipment from the construction site for repairs and the delivery to the construction site of the same or substitute equipment. The number of Work days in the period for each rate shall be as indicated below:

Three Work days or less.	Daily Rate
More than three Work days but not more than fifteen Work days.	Weekly Rate
More than fifteen Work days.	Monthly Rate

The pro rata portion which one hour bears to the applicable rate shall be determined in accordance with the following formula:

Hourly rate based on daily rental.	1/8 of daily rental from Blue Book
Hourly rate based on weekly rental.	1/40 of weekly rental from Blue Book
Hourly rate based on monthly rental.	1/176 of monthly rental from Blue Book

- 2.) The rental rate shall be multiplied by the applicable regional adjustment factor shown for such item of equipment in the Blue Book. The adjustment factor shall not apply to the hourly operating cost.
- 3.) If Owner should determine that the nature or size of the equipment used by Contractor in connection with Extra Work is larger or more elaborate, as the case may be, than the size or nature of the minimum equipment determined by Owner to be suitable for the Extra Work, the reasonable rental will not be based upon the equipment used by Contractor but will be based on the smallest or least elaborate equipment determined by Owner to have been suitable for the performance of the Extra Work, unless Contractor can demonstrate improved economy or scheduling by utilizing such larger or more elaborate equipment.
 - (a) In the case of equipment utilized only for Extra Work: (a) in addition to amounts determined as provided in subparagraphs A and B above, there will be added to the rental as computed above the taxes on the rental actually paid by Contractor or subcontractor and the reasonable cost of transporting such equipment to and from the construction site, and (b) notwithstanding the number of hours during which such equipment is utilized, the minimum rental therefor will be for a period of eight hours. The rates to be used are the Blue Book rates applicable to work performed in New York City. The Blue Book additions applicable to equipment subject to extraordinarily hard usage are expressly applicable.

In computing Contractor's compensation insofar as it is based upon Extra Work, and notwithstanding any provision to the contrary appearing in the Blue Book, no consideration shall be given to any items of cost or expense not expressly set forth above, it being expressly agreed that the costs and percentage additions hereinbefore provided cover items of cost and expense to Contractor of any type whatsoever, including administration, overhead, all salaried employees, taxes (if any), clean-up, consumables including gas and oil, drafting (including printing or other reproduction), coordination, field measurements, maintenance, repairs, profit to Contractor and small tools.

Whenever any Extra Work is performed, Contractor shall, at the end of each day, submit to Owner (a) daily time slips showing the name and number of each worker employed on such Work, the number of hours which such worker is employed thereon, the character of such workers' duties, and the wages to be paid to such worker, (b) a memorandum showing the rates and amounts of workers' compensation insurance premiums, if any, and state and federal taxes based on such wages, and vacation allowances and union dues and assessments which the employer actually pays pursuant to contractual obligation upon the basis of such wages (c) a memorandum showing the amount and character of the materials furnished for such Work, from whom they were purchased and the amount to be paid therefor, and (d) a memorandum of equipment used in the performance of such Work, together with the rental claimed therefor. Such memoranda and time slips are for the purpose of enabling Owner to determine the amounts to be paid by Owner under this Article; and accordingly, they shall constitute a condition precedent to such payment and the failure of Contractor to furnish them with respect to any Work shall constitute a conclusive and binding determination on Contractor's part that such Work is not Extra Work and shall constitute a waiver by Contractor of claims for payment for such Work. In the event that Owner and Contractor shall agree in writing upon a lump sum or other compensation for Extra Work in lieu of compensation as provided in the second paragraph of this Article, the daily time slips and memoranda required by this paragraph shall not be required subsequent to the date on which such agreement has been reached.

8. MONTHLY PAYMENTS; MONTHLY REPORTS

On or about the first day of each month, Contractor shall furnish to Owner:

- A. a Requisition for payment showing the percentage of Work completed during the prior month and for the entire Project to date, itemized separately by line-item according to the Schedule of Values set forth in Annex "2" to the Trade Agreement; a separate section of the requisition shall show the amount of Extra Work performed during the period covered by the requisition and the compensation due the Contractor under the terms of the applicable Change Order;
- B. a certification by Contractor that the payments so requested are properly due and payable under the Contract;
- C. a certification in writing in such form as may be required pursuant to Article 21 hereof that Contractor has paid and caused Contractor's subcontractors to pay at least the prevailing rate of wage and supplements required by such Article;
- D. Waivers of lien from Contractor and every subcontractor (in the forms set forth in Exhibit "2") covering all payments to Contractor; and

- E. any other documents specifically required, under other provisions of the Contract Documents, to be delivered with Contractor's monthly requisition pursuant to this Contract.

Owner shall pay Contractor the sums determined to be due by Owner, minus, however, retainage in the amount of five percent (5%) of such sum and minus all prior advances and payments to Contractor or for Contractor's account. Owner shall pay Contractor the undisputed amount of such retainage upon ninety-nine percent (99%) completion of the Work, less an amount equal to two times the value of all incomplete and/or punch list Work (which shall be paid on issuance of a certificate of Final Completion in accordance with Article 9).

Within seven days of receipt of any sum attributable to Work performed by a subcontractor or Materialman or within such later period as is provided in the subcontract or purchase agreement, Contractor shall pay to such subcontractor or Materialman (and each of them shall pay their respective subcontractors and Materialmen, as applicable) said sum, less such amount, if any, as Contractor is authorized to retain under the subcontract or purchase agreement. If (i) Owner receives notice that Contractor has, without Owner's approval, failed to pay any subcontractor or Materialman an amount properly due to such subcontractor or Materialman from funds previously paid by Owner to Contractor within such seven day period and (ii) Contractor fails to persuade Owner (in Owner's reasonable judgment) that the funds are withheld for good cause, then, within seven days after Notice from Owner, Contractor shall immediately pay the amount properly due to such subcontractor or Materialman, or (if Owner so specifies) shall return such funds to Owner with interest at an annual rate equal to the Prime Rate published by the Wall Street Journal plus one percentage point from the date when due. Subject to the proviso set forth below, Owner shall thereafter have the right, in its sole discretion, to directly pay any and all subcontractors and Materialmen who perform Work for or furnish material to Contractor in connection with the Work of this Contract; and if Owner makes any such payments to the applicable Contractor or Materialman, Owner shall have the right to deduct any and all such payments from any amounts due from Owner to Contractor pursuant to this Contract. For the avoidance of doubt, any payment made directly by Owner to a subcontractor or Materialman shall not be construed to place Owner in privity of contract with such subcontractor or Materialman or release Contractor from any responsibility or other authority under this Contract.

Prior to approving any amount for payment hereunder, Owner may require that Contractor submit a certification accurately and fully setting forth the total amount due and payable to each subcontractor and supplier for Work performed or materials provided by such subcontractor or supplier in connection with the Work of this Contract. Any payment made by Owner to a subcontractor or supplier pursuant to the provisions of this Article shall be made in reliance upon such certification and all such payments shall be considered as advances to Contractor of the compensation payable hereunder. No such payment shall relieve Contractor of any of its obligations hereunder.

Owner is entitled to, and Contractor shall pay to Owner, any credits, rebates, refunds, discounts, rewards or allowances obtained from any consultant, Subcontractor, vendor, or equipment or material supplier on account of the Work, whether received by Contractor during the performance, or after the completion, of the Work.

Within ten (10) days after signing this Contract, Contractor shall submit to Owner a listing of all subcontract and material supply agreements entered into by Contractor for the performance of Work required by this Contract (or, if later, within ten (10) days after the signing of any such documents). Such listing shall include the names and addresses of each such subcontractor and supplier and the amounts payable under each such agreement. As and when any modifications are made to such agreements or any

additional subcontracts or supply agreements are entered into, Contractor shall inform Owner of such and shall indicate the amounts payable thereunder.

Nothing contained herein shall be deemed to create any additional rights in such subcontractors or suppliers or to alter the rights of Owner as such are set forth in Article 10 hereof.

On or before the 10th day of each month, Contractor shall deliver to Owner, with respect to the prior month, the following ("Contractor's Monthly Report"):

- 1.) a detailed summary of all Change Orders approved by Owner, and any Change Orders requested by Contractor to date (including any claims for Disputed Work);
- 2.) any other documents or information which Owner reasonably requests (including evidence of amounts previously paid or owing to any subcontractor or employee of Contractor);
- 3.) any other reports or information required under this Contract or by Legal Requirements as of the applicable date or otherwise reasonably requested by Owner;
- 4.) a cumulative list of delays to the Work (whether Excusable Delays or otherwise);
- 5.) a list of all RFIs previously submitted to or by Contractor;
- 6.) a report of all sales-tax exempt purchases;
- 7.) the reports required under Schedule C hereto; and
- 8.) the Section 3 Workforce Report, substantially in the form attached hereto as Exhibit A-1 to Schedule A.

It shall be a condition to payment of Contractor's payment requisition for the current month that Contractor has submitted Contractor's Monthly Report for the prior month.

9. FINAL PAYMENT

After the delivery of the Certificate of Final Completion and upon receipt from Owner of such information as may be required, Owner shall determine the total compensation earned by Contractor.

Contractor shall thereupon, as a condition to receiving final payment ("Final Payment"): (i) certify to Owner in writing, in such form as may be required pursuant to Article 21 hereunder, that Contractor has paid and caused Contractor's subcontractors to pay at least the prevailing rate of wage and supplements required by such Article; (ii) furnish to Owner a sworn statement detailing all outstanding claims of Contractor against Owner relating to the Work, including the specified liquidated amount sought in satisfaction of each such claim; and (iii) furnish to Owner a detailed, true, correct, and complete sworn statement of all claims, just and unjust, of subcontractors, Materialmen and other third persons then outstanding and which Contractor has reason to believe may thereafter be made on account of the Work.

Within 60 days after issuance of such certificate of total compensation earned (or within 60 days after receipt of the documents provided for in the immediately preceding paragraph, if required), and after

Contractor has delivered to Owner general releases and final waivers of lien (in form approved by Owner) from every subcontractor engaged by Contractor for Work under this Contract (and in any event from all parties listed in Contractor's sworn statement as having outstanding claims), Owner shall pay to Contractor the amount stated in said certificate, less all other payments and advances whatsoever to or for the account of Contractor, except that Owner shall not subtract amounts for claims against which Contractor is obligated to indemnify Owner pursuant to this Contract and for which adequate insurance coverage is available in Owner's sole determination, provided that the applicable insurers have agreed in writing with Owner that such claim(s) is (are) covered by the respective insurance policy and have accepted in writing the obligation to defend the same.

The acceptance by Contractor, or by anyone claiming by or through Contractor, of Final Payment shall be and shall operate as a release to Owner of all claims and of all liability to Contractor for all things done or furnished in connection with the Contract and for every act and neglect of Owner and others relating to or arising out of the Contract, including claims arising out of breach of contract, *quantum meruit* and claims based on claims of third persons. No payment, however, final or otherwise, shall operate to release Contractor or Contractor's sureties from any obligations in connection with this Contract or either of the Bonds.

Contractor's agreement as provided in the immediately preceding paragraph above shall be deemed to be based upon the consideration forming part of this Contract as a whole and not to be gratuitous; but in any event even if deemed gratuitous and without consideration, such agreement as provided in the immediately preceding paragraph above shall nevertheless be effective. Such release shall include all claims, whether or not in litigation and even though still under consideration by Owner or the Owner's Representative. Such release shall be effective notwithstanding any purported reservation of right by Contractor to preserve such claim. The acceptance of any check designated as "Final Payment" or bearing any similar designation shall be conclusively presumed to demonstrate the intent of Contractor that such payment was intended to be accepted as final, with the consequences provided in this Article, notwithstanding any purported reservation of rights.

Contractor agrees that Contractor shall not be entitled to, and hereby waives any right Contractor might otherwise have to, and shall not seek any judgment whether under this Contract or otherwise for any such Final Payment or for an amount equivalent thereto or based thereon, or for any part thereof, if such judgment would have the effect of varying, setting aside, disregarding or making inapplicable the terms of this Article 9 or have the effect in any way of entitling Contractor to accept such Final Payment or an amount equivalent thereto or based thereon or any part thereof other than in the same fashion as a voluntary acceptance of a Final Payment subject to all the terms of this Contract including this Article 9.

10. WITHHOLDING OF PAYMENTS

If (1) Contractor fails to perform any of Contractor's obligations under this Contract (including Contractor's obligation to Owner to pay any claim lawfully made against Contractor by any Materialman, subcontractor or Worker or other person which arises out of or in connection with the performance of this Contract or any other agreement with Owner) or (2) any claim (just or unjust) which arises out of or in connection with this Contract is made against Owner by any person or entity or (3) any subcontractor of Contractor under this Contract fails to pay any claims lawfully made against such subcontractor by any Materialman, subcontractor, worker or other person which arises out of or in connection with this Contract, or (4) if in the opinion of Owner any of the aforesaid contingencies is likely to arise; then, in any such event, Owner shall have the right, in its discretion, to withhold out of any payment (final or otherwise and even though such payment has already been certified as due) such sums as Owner may deem ample to protect Owner against delay or loss or to assure the payment of just claims of third persons, and to apply such sums in such manner as Owner may deem proper to secure such protection or

satisfy such claims. All sums so applied shall be deducted from Contractor's compensation due under this Contract. Omission by Owner to withhold out of any payment, final or otherwise, a sum for any of the above contingencies, even though such contingency has occurred at the time of such payment, shall not be deemed to indicate that Owner does not intend to exercise its right with respect to such contingency. Neither the above provisions for rights of Owner to withhold and apply monies nor any exercise or attempted exercise of, or omission to exercise, such rights by Owner shall create any obligation of any kind to such Materialmen, subcontractors, workmen or other third persons. At such time as (and to the extent that) the cause of a withholding of payment under this Article is removed, Owner shall pay Contractor the relevant amount so withheld.

Until actual payment to Contractor, Contractor's right to any amount to be paid under this Contract (even though such amount has already been certified as due) shall be subordinate to the rights of Owner under this Article 10.

CHAPTER III

PROVISIONS RELATING TO TIME

11. CORRECTION OF WORK; GUARANTEES

Contractor shall complete, repair, replace, rebuild and/or correct promptly prior to Final Completion all Work which is incorrect, defective, incomplete, omitted, or not otherwise in compliance with the Contract Documents.

After Final Completion, Contractor guarantees unconditionally to complete, repair, replace, rebuild and/or correct promptly all Work which is incorrect, defective, incomplete, omitted, or not otherwise in compliance with the Contract Documents, of which Architect or Owner gives written notice to Contractor at any time during the Guarantee Period.

Unless otherwise set forth in the Contract Documents, "Guarantee Period" means the period commencing on the date of the Certificate of Final Completion and continuing for the following period or periods: (a) through and until 365 days thereafter and/or during any other period(s) set forth in the Contract Documents, whichever is longer; and (b) with respect specifically to any Work completed, repaired, replaced, rebuilt and/or corrected by Contractor after Final Completion and during the period specified in (a) above, through and until the later of (i) 365 days after the completion of the specific corrective action, or (ii) the unexpired portion of the period specified elsewhere in the Contract Documents for the portion of the Work which was the subject of the specific corrective action.

If Contractor fails to commence corrective action as required above within ten (10) days after written notice from Owner, or if Contractor does not thereafter prosecute such action diligently to completion, Owner may undertake the necessary corrective action itself or through other Persons at Contractor's expense.

The costs of corrective Work referred to in this Article shall include the following: (a) amounts paid by Owner to any contractor, consultant, or other Person engaged by Owner to advise, consult, or furnish labor, materials, services or equipment of any kind necessary or desirable to perform the necessary corrective Work; (b) costs of correcting, repairing or replacing any other Work or part of the Project, or work of any other contractor, damaged, removed, or uncovered by reason of Contractor's defective or omitted Work; (c) all costs of removing rejected Work from the Site; and (d) all other fees and costs which Owner incurs in connection with the foregoing.

Owner may elect, by Change Order, to accept defective or non-conforming Work and charge Contractor for the amount by which the value of the Work has reasonably been reduced. (Any such change shall be deducted from any unpaid balance of the amounts due Contractor under the Contract to the extent of such balance and Contractor shall pay Owner any amount exceeding such unpaid balance, upon demand.)

Contractor shall secure from the manufacturers of equipment and materials required under the Contract such manufacturers' standard warranties and guarantees (or such other warranties and guarantees as the Contract Documents may require) in Owner's name and deliver the same to Owner. (This paragraph supplements the other provisions of this Article and shall not be construed to relieve Contractor of any responsibility under this Article.)

This Article (and the Guarantee Period specified herein or elsewhere in the Contract Documents) establishes only Contractor's specific obligation to correct the Work and shall not be construed to establish a period of limitation with respect to any other obligations or liabilities of Contractor under the Contract Documents (including a breach of any obligation under Article 2). This Article is intended to supplement (and not to limit) Contractor's obligations under other provisions of the Contract Documents or under Laws.

12. EXTENSIONS OF TIME FOR EXCUSABLE DELAYS

The time provided for completion of any part of the Contract shall be extended (subject, however, to the provisions of this Article 12) only if Contractor is necessarily delayed in completing such part solely and directly by an Excusable Delay (or Excusable Delays) and upon Contractor's compliance with the requirements of this Article.

In any event, even though an Excusable Delay meets all the above conditions, an extension of time for Contractor's performance shall be granted only to the extent that (i) the performance of the Work is actually and necessarily delayed and (ii) the effect of such cause cannot be anticipated and avoided or mitigated by the exercise of reasonable precautions, efforts and measures (including planning, scheduling and rescheduling), whether before or after the occurrence of the cause of such delay, and an extension shall not be granted for a cause of delay which would not have affected the performance of the Contract were it not for Contractor's error, mismanagement, fault, or neglect or for other delay for which Contractor is not entitled to an extension of time.

The period of any extension of time shall be that necessary to make up the time actually lost, subject to the provisions of this Article, and shall be only for the portion of the Work actually delayed. Owner may defer all or part of its decision on an extension pending Owner's receipt from Contractor of all information reasonably necessary for Owner's decision. Contractor shall not be entitled to a separate extension of time for each of several causes of delay operating concurrently but only for the overall delay regardless of the number of causes.

As a condition precedent to any extension of time, Contractor shall give written notice to Owner within 15 days after the time when Contractor knows or should know of any cause which might under any circumstances result in an Excusable Delay for which Contractor claims or may claim an extension of time (including those causes which Owner is responsible for or has knowledge of), specifically stating that an extension is or may be claimed, identifying such cause and describing, as fully as practicable at the time, the nature and expected duration of the delay and its effect on the various portions of the Contract. Since the possible necessity for an extension of time may materially alter the scheduling, plans and other actions of Owner, and since, with sufficient opportunity, Owner might, if it so elects, attempt to mitigate the effect of a delay for which an extension of time might be claimed, and since merely oral notice may cause disputes as to the existence or substance thereof, the giving of written notice as above required shall

be of the essence of Contractor's obligations and failure of Contractor to give written notice within the time, and containing the information, specified above shall be a conclusive waiver of an extension of time in the particular case.

It shall in all cases be presumed that no extension, or further extension, of time is due unless Contractor shall affirmatively demonstrate to the reasonable satisfaction of Owner that it is so due. To this end Contractor shall maintain adequate records supporting any claim for an extension of time, and in the absence of such records, the foregoing presumption shall be deemed conclusive.

13. ACCELERATION

A. If at any time the Work is not progressing in accordance with the Contractor's Schedule or milestone schedule for this Contract or the Work is likely to be delayed for any reason within the control of Contractor, or if Owner otherwise desires to accelerate the Work for any reason, Owner may give Contractor Notice requiring Contractor to:

- 1.) increase the number of workers and/or the amount or types of machinery, tools, equipment, or materials employed by Contractor in or for the performance of the Work; and/or
- 2.) schedule and conduct additional lawful work shifts.

Contractor shall undertake immediately all such action which Owner so requires, subject to availability of labor and materials (unless Owner deems such action necessary by reason of Contractor's failure to make timely arrangements for labor and materials). Costs of additional labor, machinery, tools, equipment and/or materials, if any, required by Owner under this Article:

- 3.) shall be borne by Contractor as part of the Lump Sum if and to the extent the applicable acceleration of Work was necessary or appropriate to maintain Contractor's compliance with, and progress under, the Contractor's Schedule or milestone schedule for this Contract as updated pursuant to the Contract Documents immediately prior to the date of such acceleration; or
- 4.) otherwise shall be borne by Owner as Extra Work.

B. If Owner and Contractor do not agree as to the cause of any delay in the Work, or if Contractor disputes the necessity of accelerating the Work, nevertheless Contractor shall comply with Owner's requirements and shall continue to prosecute the Work, subject to Article 17 hereof (with respect only to a determination of compensation for Extra Work). Whether or not Owner exercises the same, Owner's right to accelerate performance of the Work under this Article shall not limit, modify or waive any of Owner's rights or remedies under the Contract and shall not excuse Contractor from the obligation to employ and/or furnish labor, machinery, tools, equipment, materials, or other Work on an overtime or accelerated basis or otherwise in such extra or additional lawful amounts as may be necessary to complete the Work when required under the Contracts Documents.

C. If at any point Contractor fails to meet a milestone set forth in the Contractor's Schedule or milestone schedule for this Contract, and such failure is not due to an Excusable Delay, Owner may require Contractor to make such revisions to the Contractor's

schedule of Work as will enable Contractor to achieve Final Completion by the Final Completion Date. Any additional Work required as a result of such revisions shall not be deemed Extra Work, nor entitle Contractor to additional compensation.

14. DELAYS TO CONTRACTOR

A. Costs associated with delays to Contractor:

- 1.) Shall be borne by Contractor as part of the Lump Sum if and to the extent the applicable delay of work was caused by the Contractor or any entity other than the Owner or any other Contractor of Owner; or
- 2.) Otherwise shall be borne by Owner as Extra Work.

15. CANCELLATION FOR DELAY

If the performance of the Contract or any portion of it shall, in the opinion of Owner, be materially delayed, whether or not through the fault of Contractor, by any cause which affects Contractor's ability to perform the Contract without affecting to the same degree Owner's own ability to perform it, either directly or through others, Owner shall have the right at any time during the existence of such delay to cancel this Contract as to any portion not yet performed, without prejudice to the rights, liabilities and obligations of the parties under this Contract arising out of portions already performed. In the event of such cancellation, no allowance shall be made for anticipated or lost profits. This provision supplements (and does not restrict) Article 16 hereof.

CHAPTER IV

CONDUCT OF CONTRACT

16. TERMINATION BY OWNER

If at any time it shall be, from the viewpoint of Owner, impracticable or undesirable in Owner's sole judgment to proceed with or continue the performance of the Contract or any part thereof, whether or not for reasons beyond the control of Owner and for any reason or for no reason (i.e., with or without cause), Owner shall have authority to suspend performance of any part or all of the Contract until such time as Owner may deem it practicable or desirable to proceed. Moreover, if at any time it shall be, from the viewpoint of Owner, impracticable or undesirable in Owner's judgment to proceed with or continue the performance of the Contract or any part thereof for any reason or for no reason (i.e., with or without cause), Owner shall have authority to cancel this Contract as to any or all portions not yet performed and as to any materials not yet installed even though delivered. Such cancellation shall be without prejudice to the rights and obligations of the parties arising out of portions already performed. For such cancellation, Contractor shall receive as its entire remaining compensation a cancellation payment consisting of the following: (a) all amounts due but not yet paid Contractor under the Contract for Contractor's Work completed prior to the cancellation date; (b) direct costs of any supplies, materials, machinery, equipment, or other property specially purchased by Contractor or any subcontractor for the Work and not capable of installation or use elsewhere except as a part of the Work under this Contract; (c) other reasonable costs for which Contractor is obligated under non-cancelable agreements, even though Contractor has not yet received delivery or performance of the applicable Work (but limited as though all subcontractors of Contractor have received a cancellation notice effective as of the same date and are bound by similar provisions in the Subcontracts); (d) any reasonable loss sustained by Contractor on other materials or equipment previously purchased for the Work and resold in a commercially

reasonable manner for less than the purchase price; and (e) any reasonable documented out-of-pocket direct costs associated with demobilization incurred by Contractor resulting from the cancellation; but (f) no allowance shall be made for mark-up on the foregoing or other anticipated or lost profit except that Contractor shall receive 2.5% on the sum of the costs specified in (a) through (e) above to cover administrative costs of such cancellation.

17. INTERPRETATIONS AND DISPUTE RESOLUTION

Inasmuch as the public interest requires that the Project to which this Contract relates shall be performed in the manner which Owner deems best, Owner shall have authority, in the first instance, subject to this Article 17, to determine what is or is not necessary or proper for or incidental for the Project. In the exercise of this authority, Owner shall have power to alter the Scope of Work; to require the performance of Work not required by the Contract Documents in their present form, even though of a totally different character from that now required; and to vary, increase and diminish the character, quantity and quality of, or to countermand, any Work now or hereafter required, subject, however, to Articles 7 and 22. Such variation, increase, diminution or countermanding need not be based on necessity but may be based on convenience.

Subject to this Article 17, to resolve all disputes and to prevent litigation prior to completion of the Work, Owner and Contractor authorize the Interim Arbitrator to decide all questions of any nature whatsoever arising out of, under, or in connection with, or in any way related to or on account of, this Contract (including claims in the nature of breach of Contract or fraud or misrepresentation before or subsequent to signing of this Contract and claims of a type which are barred by the provisions of this Contract) upon and subject to the terms and conditions in this Article. The Interim Arbitrator's decision may be based on such assistance as the Interim Arbitrator may find desirable. The effect of the Interim Arbitrator's decision shall not be impaired or waived by any negotiations or settlement offers in connection with the question decided, whether or not he participated therein himself, or by any prior decision of others, which prior decisions shall be deemed subject to review, or by any termination or cancellation of this Contract.

All such questions shall be submitted in writing by Contractor to the Interim Arbitrator for his decision, together with all evidence and other pertinent information in regard to such questions, in order that a fair and impartial decision may be made. In any action against Owner relating to any such question, Contractor must allege in Contractor's complaint and prove such submission, which shall be a condition precedent to any such action. No evidence or information shall be introduced or relied upon in such an action that has not been so presented to the Interim Arbitrator, except to the extent that the party proposing to introduce or rely upon the same establishes that such evidence or information was not reasonably available or reasonably understood to be significant at the time of the proceeding before the Interim Arbitrator. For the avoidance of doubt, Contractor may only invoke the provisions of this Article 17 with respect to disputes with Owner.

If Contractor or Owner gives written notice of dispute to the other (or if Contractor or Owner otherwise dispute any action of the other or of the Interim Arbitrator and they fail to resolve their dispute within 21 days after written notice from one party to the other advising of the dispute and specifying this Article 17), either party may submit a notice of dispute to the Interim Arbitrator. Each such submission to the Interim Arbitrator shall specify in reasonable detail:

- (a) the nature of the dispute, or any information or interpretation requested by the party (the "petitioner") giving notice to the Interim Arbitrator:
- (b) the date when the petitioner reasonably requires a decision; and

- (c) the petitioner's proposed determination to resolve the dispute.

The petitioner shall include with such request all documents and other materials which the petitioner deems relevant. The petitioner shall promptly furnish any other information which the Interim Arbitrator requests in connection with any such matter. The petitioner shall give copies to the other party (the "respondent") of all documents or other materials submitted by the petitioner to the Interim Arbitrator.

The Interim Arbitrator shall review each matter submitted and shall allow the respondent an opportunity to submit a written statement of the respondent's position, together with any documents or materials which the respondent deems relevant (which shall be given to the petitioner). The Interim Arbitrator may also confer with both parties to discuss the dispute and may allow either party to submit a further written statement (or statements) of its position or oral presentation or testimony. In considering or rendering any decision, the Interim Arbitrator shall construe, interpret, and apply the Contract strictly in accordance with its terms. The Interim Arbitrator shall deliver a decision to Contractor and Owner within 30 days after the parties have submitted their final presentations as above. The decision of the Interim Arbitrator may follow the "baseball" format—that is, the Interim Arbitrator may select either the determination proposed by Owner or the determination proposed by Contractor without modification; or the Interim Arbitrator may issue a decision based on the Interim Arbitrator's own determination of the relevant issue. Contractor and Owner shall comply promptly with decisions of the Interim Arbitrator.

Contractor shall not stop Work during the pendency of any dispute nor shall Owner withhold any undisputed amount which is properly due and payable under the provisions of this Contract.

A surety issuing any Bond with respect to the Contract shall be bound by decisions of the Interim Arbitrator to the same extent as Contractor. Moreover, by issuing its Bond such surety shall be deemed to have agreed that submission of any matter to the Interim Arbitrator, and/or any decision or other action of the Interim Arbitrator, shall not discharge, release, amend, or waive such Bond or any rights of Owner thereunder.

18. OWNER'S REVIEWS AND INSPECTIONS

Subject to Article 17: (a) in the performance of the Contract, Contractor shall conform to all orders, directions and requirements of Owner and shall perform the Contract to the satisfaction of Owner at such times and places, by such methods and in such manner and sequence as required by the Specifications, and the Contract shall at all stages be subject to Owner's and Architect's inspection; (b) Owner and/or the Architect shall determine the amount, quality, acceptability and fitness of all parts of the Work and shall interpret the Contract Documents, Specifications and any orders for Extra Work and (c) Contractor shall employ no equipment, materials, or workers to which Owner objects, and shall remove no materials, equipment or other facilities from the construction site without permission. Upon request, Owner shall confirm in writing any oral order, direction, requirements or determination.

Contractor shall advise Owner and Architect promptly in writing of questions pertaining to the Work as they arise.

The enumeration herein or in the Contract Documents of particular instances in which the opinion, judgment, discretion or determination of Owner shall control or in which the Contract shall be performed to Owner's satisfaction or subject to Owner's inspection, shall not imply that only the matters of a nature similar to those enumerated shall be so governed and performed, but without exception the entire Contract shall be so governed and so performed.

Owner has engaged the Owner's Representative to provide project management and owner's representative services with respect to the Contract (all as set forth in separate agreement(s) between Owner and the Owner's Representative). For the avoidance of doubt, references to "Owner" in this Agreement shall also be deemed to be references to the Owner's Representative unless specifically stated otherwise. Also, Owner's Representative shall be deemed included in all indemnifications for the benefit of Owner under the Contract.

19. NOTICE REQUIREMENTS

No claim against Owner shall be made or asserted in any action or proceeding at law or in equity, and Contractor shall not be entitled to allowance of such claim, unless Contractor shall have complied with all requirements relating to the giving of Notice of the information with respect to such claim as provided in this Article and/or elsewhere in the Contract Documents. The failure of Contractor to give such Notice and information as to any claim shall be conclusively deemed to be a waiver by Contractor of such claim, such Notice and information being conditions precedent to such claim. As used herein "claim" shall include any claim arising out of, under, or in connection with, or in any way related to or on account of, this Contract (including claims in the nature of breach of contract or fraud or misrepresentation before or subsequent to the signing of this Contract and claims of a type which are barred by the provisions of this Contract) for damages, payment or compensation of any nature or for extension of any time for performance of any part of this Contract.

The requirements as to the giving of Notice and information with respect to claims shall be as follows:

- A. In the case of any claims for Extra Work, extension of time for completion, idle salaried men and equipment, or any other matter for which requirements are set forth elsewhere in this Contract as to notice and information, the respective requirements set forth in the applicable provision of this Contract shall apply.
- B. In the case of all other types of claim, Notice shall have been given to Owner, personally, as soon as practicable, and in any case, within ten (10) days, after occurrence of the act, omission, or other circumstance upon which the claim is or will be based, stating as fully as practicable at the time all information relating thereto. Such information shall be supplemented with any further information as soon as practicable after it becomes or should become known to Contractor, including daily records showing all costs which Contractor may be incurring or all other circumstances which will affect any claim to be made, which records shall be submitted to Owner, personally.

The above requirements for Notices and information are for the purpose of enabling Owner to cancel or revise any order, change its plans, mitigate or remedy the effects of circumstances giving rise to a claim or take such other action as may seem desirable and to verify any claimed expense or circumstances as they occur, and the requirements herein for such Notice and information are essential to this Contract and are in addition to any notice required by statute with respect to suits against Owner.

The Notices and information referred to above are required whether or not Owner is aware of the existence of any circumstances which might constitute a basis for a claim and whether or not Owner has indicated it will consider a claim.

No act, omission, or statement of any kind shall be regarded as a waiver of any of the provisions of this Article or may be relied upon as such waiver except only either a written statement signed by Owner expressly stating that a waiver is intended as to any particular provision of this Article, and more particularly no discussion, negotiations, consideration, correspondence, or requests for information with

respect to a claim by any director, officer, employee or agent of Owner shall be construed as a waiver of any provision of this Article or as authority or apparent authority to effect such a waiver.

Since merely oral notice or information may cause disputes as to the existence or substance thereof, and since notice, even if written, to other persons than Owner may not be sufficient to come to the attention of the representative of Owner with the knowledge and responsibility of dealing with the situation, only Notice and information complying with the express provisions of this Article 19 shall be deemed to fulfill Contractor's obligation under this Contract.

20. NON-DISCRIMINATION AND AFFIRMATIVE ACTION; OPPORTUNITY DOWNTOWN PLAN; OTHER REQUIREMENTS

Contractor shall comply with all terms, covenants, conditions and provisions of Schedule "C" hereto which set forth requirements regarding Non-Discrimination and Affirmative Action as if fully set forth herein; and the same are incorporated herein by reference.

Contractor shall also comply with all requirements set forth in Schedule "A" hereto.

Schedule "F" hereto sets forth the "Opportunity Downtown Plan" which Contractor, Owner and LMDC have jointly adopted to reflect the goal and procedures of Contractor to encourage and promote participation in this Project by women-owned, minority-owned, and downtown Manhattan-owned business enterprises and by the categories of individuals described in such plan. The Opportunity Downtown Plan is incorporated herein and compliance therewith will be deemed Contractor's compliance with the requirements of clauses I(5) and II of Schedule "C."

Contractor shall (and Contractor shall cause its subcontractors to) follow Owner's procedures to confirm that all persons employed on the site are either citizens of the United States or legal aliens with valid work visas.

21. PREVAILING RATE OF WAGE

Contractor shall pay or provide (and shall cause all subcontractors to pay or provide) to Contractor's or subcontractors' Workers, laborers and mechanics (who are employed by Contractor or them to work on an hourly or daily basis at any trade or occupation at or about the construction site or elsewhere in connection with the Work) at least the prevailing rate of wage and supplements for others engaged in the same trade or occupation in the locality in which the Work is being performed as determined by Owner.

For purposes of this Contract, the prevailing rates of wage and supplements are those established by the Secretary of Labor of the United States pursuant to the Davis-Bacon Act (40 U.S.C.A. 276a) for the locality in which the Work is to be performed. The applicable rates shall be those which are in effect on the date of the signing of this Contract.

The provisions of this Article 21 are inserted in this Contract for the benefit of such Workers, laborers and mechanics as well as for the benefit of Owner; and if Contractor or any subcontractor shall pay or provide any such Worker, laborer or mechanic less than the rates of wages and supplements above described, such Worker, laborer or mechanic shall have a direct right of action against Contractor or such subcontractor for the difference between the wages and supplements actually paid or provided and those to which she is entitled under this Article. If such Worker, laborer or mechanic is employed by any subcontractor whose subcontract does not contain a provision substantially similar to the provisions of this Article (requiring the payment or provision of at least the above minimum, and providing for a cause of action in the event of the subcontractor's failure to pay or provide such wages and supplements) such Worker, laborer or

mechanic shall have a direct right of action against Contractor. Owner shall not be a necessary party to any action brought by any Worker, laborer or mechanic to obtain a money judgment against Contractor or any subcontractor pursuant to this Article.

Nothing herein contained shall be construed to prevent Contractor or any subcontractor from paying higher rates of wages or providing higher supplements than the minimum hereinbefore prescribed; and nothing herein contained shall be construed to constitute a representation or guarantee that Contractor or any subcontractor can obtain Workers, laborers and mechanics for the minimum herein before prescribed.

In an area of Contractor's office at the Site which is accessible to Contractor's employees, Contractor shall display printed material setting forth information for the employees of Contractor and Contractor's subcontractors concerning the wage and supplemental benefit requirements set forth in this Article. Contractor shall also cause each of Contractor's subcontractors to display such material in a similarly accessible place in any office which the subcontractor maintains at the Site.

Owner may at any time (including with each monthly requisition) request that Contractor and each subcontractor certify in writing that Contractor (and the applicable subcontractor) has paid or provided (and has caused all subcontractors to pay or provide) at least the prevailing rates of wage and supplements required by this Article 21 and Contractor shall comply (and cause its subcontractors to comply) with any such request within ten (10) calendar days of Contractor's receipt thereof. Contractor shall include in Contractor's certification such detail as Owner may require with respect to hourly wages and supplements actually paid or provided by Contractor or any subcontractor to each of Contractor's or their laborers, Workers and mechanics employed as described in this Article, records of which shall be prepared by Contractor and maintained as required by Article 3 hereof (and Contractor shall cause such records to be prepared and maintained in the same manner by subcontractors). Contractor's certification shall be executed by a corporate officer, if Contractor is a corporation; a partner, if Contractor is a partnership; a manager, if Contractor is a limited liability company; or the owner, if Contractor is a sole proprietorship.

Contractor's failure to comply with any provision of this Article 21 shall be deemed a substantial breach of this Contract.

22. EXTRA WORK ORDERS

No Extra Work shall be performed except pursuant to a Change Order of Owner expressly and unmistakably indicating Owner's intention to treat the Work described therein as Extra Work, subject to the next paragraph.

If Contractor is of the opinion that any Work ordered to be done as Work pursuant to the Contract Documents is instead Extra Work ("Disputed Work"), Contractor shall nevertheless comply with such order, but shall within 72 hours give written notice thereof to Owner, stating why Contractor deems it to be Extra Work, and shall moreover furnish to Owner time slips and memoranda as required by Article 7 hereof. Said notice, time slips and memoranda are for the purpose of affording to Owner an opportunity to verify Contractor's claim at the time and (if Owner desires so to do) to cancel promptly such order, direction or requirement, of affording to Owner an opportunity of keeping an accurate record of the materials, labor and other items involved, and generally of affording to Owner an opportunity to take such action as it may deem desirable in light of Contractor's claims. Accordingly, the failure of Contractor to serve such notice or to furnish such time slips and memoranda shall be deemed to be a conclusive and binding determination on Contractor's part that the direction, order or requirement does not involve the performance of Extra Work, and shall be deemed to be a waiver by Contractor of all claims for additional compensation or damages by reason thereof, such written notice, time slips and memoranda being a condition precedent to such claims. For any Extra Work that is not Disputed Work, where Owner so

directs by notice to Contractor, Contractor shall not be obligated to perform such Extra Work prior to Contractor's receipt of a written order from Owner in accordance with the provisions of this Article 22. Contractor shall not stop Work by reason of any dispute as to whether or not a particular task is Extra Work.

23. PERFORMANCE OF EXTRA WORK

The provisions of this Contract relating generally to Work and its performance shall apply without exception to any Extra Work required and to the performance thereof. Moreover, the provisions of the Contract Documents relating generally to the Work and its performance shall also apply to any Extra Work required and to the performance thereof, except to the extent that a written order in connection with any particular item of Extra Work may expressly provide otherwise.

24. ACCESS TO WORK; INSPECTIONS; TESTING

During the progress of the Work through Final Completion, Contractor shall at all times afford LMDC, the Foundation, the Owner's Representative, Architect, ESDC, the Interim Arbitrator, PANYNJ, and Silverstein and any other persons designated by Owner, access to the Work and every reasonable, safe, and proper facility for inspecting or examining all Work at the Site.

Owner may at any time conduct (or cause to be conducted) such on-site inspections and such structural, environmental, mechanical, electrical, chemical, or other tests as Owner deems necessary or desirable to ascertain whether the Work complies with the Contract or for any other reason. Owner will pay for a test or inspection requested by Owner as Extra Work, unless such test or inspection reveals a failure of the Work to comply with this Contract or Laws, in which event Contractor shall bear all expenses of such inspection or test.

Contractor shall secure and deliver to Owner promptly all certificates of inspection, test reports, work logs, or approvals with respect to the Work as and when required by this Contract (or by Laws which place responsibility for the same on Contractor).

25. ASSIGNMENTS AND SUBCONTRACTS; PRE-APPROVED SUBCONTRACTORS

Any assignment or other transfer by Contractor of this Contract or any part hereof or of any of Contractor's rights hereunder or of any monies due or to become due hereunder and any delegation of any of Contractor's duties hereunder without the express consent in writing of Owner shall be void and of no effect as to Owner, provided, however, that Contractor may subcontract portions of the Work to such persons as Owner may, from time to time, expressly approve in writing as set forth below. For each Person proposed by Contractor as a Subcontractor in addition to those already approved and listed on Annex "1" to the Trade Agreement, Contractor shall submit to Owner such information as Owner may reasonably require to ascertain the qualification and experience of the prospective Subcontractor, including the submission of a completed Standard Business Background Questionnaire in the form attached hereto as Exhibit "3".

Annex "1" to the Trade Agreement lists all subcontractors of Contractor approved by Owner as of the signing of this Contract. The forms of agreements between Contractor and any such subcontractor and the hourly rates of such subcontractors shall be subject to Owner's review and approval, and Contractor shall ensure that such agreements are substantially in the form of this Contract. Further subcontracting by Contractor and/or any subcontractor shall be subject to (a) approval of Owner in its sole discretion; and (b) qualification by the subcontractor with all documentation, approval and filing requirements which would apply if such subcontractor were seeking to be approved as a direct contractor of the City of New

York. Approval of a subcontractor may be rescinded for, among other things, failure of Contractor to furnish the subcontractor's certificate of insurance within the time set forth in Schedule "G" attached hereto.

No consent to any assignment or other transfer, and no approval of any subcontractor, shall under any circumstances operate to relieve Contractor of any of Contractor's obligations; no subcontract, no approval of any subcontractor and no act or omission of Owner or the Owner's Representative shall create any rights in favor of such subcontractor and against Owner; and as between Owner and Contractor, all assignees, subcontractors, and other transferees shall for all purposes be deemed to be agents of Contractor.

If Owner objects to the performance of any subcontractor, Owner may give Contractor a written notice of objection that states Owner's reasons for objection; and Contractor shall take such action as necessary or appropriate to correct and cure the problems in performance by such subcontractor which are the subject of Owner's Notice. All acts, omissions, and failure or inability to perform by any subcontractor shall be deemed those of Contractor under this Contract.

Each Subcontract shall include a provision under which the subcontractor agrees that the Subcontract shall be assigned to Owner, at Owner's written election, upon a termination of Contractor's rights to perform the Contract (such assignment to become effective upon Owner's giving written notice to the subcontractor) and shall likewise provide that if Contractor's contract is terminated that such Subcontract shall be assigned to Owner (or any replacement construction manager) at Owner's written election.

26. CLAIMS OF THIRD PERSONS; DISCHARGE OF LIENS

Contractor undertakes to pay all claims lawfully made against Contractor by subcontractors, Materialmen and workers, and all claims lawfully made against Contractor by other third persons arising out of or in connection with or because of the performance of this Contract and to cause all subcontractors to pay all such claims lawfully made against them.

If any subcontractor, Materialman or any other person claiming to have been employed (directly or indirectly) by or through Contractor or any subcontractor files a lien (unless as a result of Owner's failure to pay an amount properly due under this Contract), Contractor shall satisfy, remove or discharge such lien at Contractor's expense by bonding, payment or otherwise within thirty (30) days after notice to Owner of the filing thereof. If Contractor fails to do so, Owner may satisfy, remove or discharge such lien; and, at Owner's election:

- A. Owner may deduct the cost thereof (including all applicable fees and costs, including attorney's fees) from Contractor's next succeeding requisition(s) (or may invalidate all or a portion of any previously-approved but unpaid requisitions) until Owner recoups the total cost thereof; or
- B. Contractor shall pay the same to Owner upon demand.

27. CERTIFICATES OF PARTIAL COMPLETION

If at any time prior to the giving of the Certificate of Final Completion, any portion of the Work has been satisfactorily completed, and if in the judgment of Owner such portion of the Work is not necessary for the operations of Contractor but will be immediately useful to and is needed by Owner for other purposes, Owner may give to Contractor a certificate in writing to that effect (herein called a "Certificate of Partial

Completion"), and thereupon or at any time thereafter Owner may take over and use the portion of the Work described in such Certificate and exclude Contractor therefrom.

The giving of a Certificate of Partial Completion shall not be construed to constitute an extension of Contractor's time to complete the portion of the Work to which it relates in the event that Contractor has failed to complete the same in accordance with the terms of this Contract. Moreover, the issuance of a Certificate of Partial Completion shall not operate to release Contractor or Contractor's sureties from any obligations under or upon this Contract or either of the Bonds.

28. FINAL COMPLETION

After the satisfactory completion of all Work whatsoever required and the making of such tests and inspections as may be necessary or desirable, Owner shall give to Contractor a certificate in writing (herein called the "Certificate of Final Completion") certifying that in Owner's opinion all Work under this Contract, including Extra Work, has been completed in accordance with the Contract Documents, and certifying the date as of which it was so completed.

The giving of the Certificate of Final Completion shall not be construed to constitute an extension of Contractor's time for performance in the event that Contractor has failed to complete the Work in accordance with the terms of this Contract. Moreover, the issuance of the Certificate of Final Completion shall not operate to release Contractor or Contractor's sureties from any obligations under or upon this Contract or either of the Bonds.

Upon Final Completion, or upon a termination of Contractor's right to perform the Contract, Contractor shall:

- A. unless Owner directly or otherwise takes possession of and uses the same under Article 35, promptly remove from the Project Site all equipment, implements, machinery, tools, temporary facilities of any kind and other property owned, leased, or rented by Contractor or subcontractors (including sheds, trailers, workshops, and toilets), and repair any damage caused by such removal;
- B. complete and comply with all other close-out requirements in the Contract Documents; and
- C. promptly cause all employees of Contractor and any subcontractors to vacate the Project Site.

If Contractor fails to comply with any obligation under this Article, Owner may perform the action contemplated after five (5) Work Days' written notice to Contractor; and, at Owner's election, Owner may deduct the entire cost (or any portion thereof) from the unpaid amount due to Contractor; or Contractor shall pay the entire cost (or any portion thereof) upon demand, notwithstanding that any other Person may have defaulted in taking similar action or occupied the same areas or otherwise had any responsibility for the condition involved. Contractor shall have no right to further payments under any payment application until Contractor has complied with all obligations under this Article.

29. NO GIFTS, GRATUITIES, OFFERS OF EMPLOYMENT, ETC.; NO MEMORABILIA

During the term of this Contract, Contractor shall not offer, give or agree to give anything of value either to an Owner employee, agent, job shopper, consultant, construction manager or other Person representing Owner, or to a member of the immediate family (i.e., a spouse, child, parent, brother or sister) of any of

the foregoing, in connection with the performance by such employee, agent, job shopper, consultant, construction manager or other Person representing Owner of duties involving transactions with Contractor on behalf of Owner, whether or not such duties are related to this Contract or any other contract or matter. Any such conduct shall be deemed a material breach of this Contract.

As used herein, "anything of value" shall include but not be limited to any (a) favors, such as meals, entertainment, transportation (other than that contemplated by the Contract or any other Owner contract), etc., which might tend to obligate a Owner employee to Contractor, and (b) gift, gratuity, money, goods, equipment, services, lodging, discounts not available to the general public, offers or promises of employment, loans or the cancellation thereof, preferential treatment or business opportunity. Such term shall not include compensation contemplated by this Contract or any other Owner contract.

Contractor shall report to LMDC's Investigation Division (212-587-9325) directly and without undue delay any information concerning conduct which Contractor learns may involve: (x) corruption, criminal activity, conflict of interest, gross mismanagement or abuse of authority; or (y) any solicitation of money, goods, requests for future employment or benefit of thing of value, by or on behalf of any government employee, officer or public official, any contractor, employee, officer, agent, subcontractor, Materialman, or labor official, or other person for any purpose which may be related to the procurement of this Contract by Contractor, or which may affect performance of this Contract in any way.

Neither Contractor nor any subcontractor or Materialman, nor any employee of any of them, shall retain any material or items of any kind salvaged from the Site as memorabilia or souvenirs relating to September 11, 2001 or otherwise.

Contractor shall not communicate (nor permit any subcontractor or Materialman to communicate) with the media, any governmental officials, or any community organization with respect to any aspect of the Work, without the prior written approval of Owner.

Contractor shall require that all subcontracts with all subcontractors and Materialmen shall include the provisions set forth in this Article; and Contractor shall be responsible for informing its own principals and employees to the same effect.

CHAPTER V

WARRANTIES MADE AND LIABILITY ASSUMED BY THE CONTRACTOR

30. CONTRACTOR'S WARRANTIES

Contractor represents and warrants to LMDC:

- A. That Contractor is financially solvent, that Contractor is experienced in and competent to perform the type of services contemplated by this Contract, that the facts stated or shown in any papers submitted or referred to Owner by Contractor prior to the signing of this Contract are true, and that Contractor is authorized to perform this Contract;
- B. That Contractor has carefully examined and analyzed the provisions and requirements of this Contract and the Contract Documents and inspected the Site; that from Contractor's own investigations Contractor has satisfied itself as to the nature of all things needed for the performance of this Contract, the general and local conditions and all other matters which in any way affect this Contract or its performance, and that

the time available to Contractor for such examination, analysis, inspection and investigations was adequate.

- C. That the Contract is feasible of performance in accordance with all its provisions and requirements and that Contractor can and will perform it in strict accordance with such provisions and requirements;
- D. That Contractor has reviewed and is familiar with all Legal Requirements applicable to the Work required of Contractor under this Contract as of the date of the signing of this Contract;
- E. That Contractor has substantial experience in performing the type of Work required of Contractor pursuant to this Contract (including any planning, design, and engineering required thereby);
- F. That Contractor has planned and adequately provided for the logistics, mobilization, staffing, testing, management, coordination, and other planning and administration as necessary to timely complete the Work as required of Contractor under this Contract;
- G. That, as and to the extent that such representation affects Contractor or the performance of Contractor's Work under this Contract, Contractor has made or will make all inspections and investigations of the physical structure, condition and components of the Site; and of any plans and other documents delivered to Contractor by Owner, PANYNJ, or Owner's Representative which Contractor, in Contractor's judgment, deems necessary or desirable for Contractor's performance of the Work under this Contract;
- H. That, as and to the extent that such representation affects Contractor or the performance of Contractor's Work under this Contract, Contractor has made or will make appropriate inquiry of PANYNJ, the Metropolitan Transit Authority, any applicable utility companies, and the City of New York as to subsurface or transportation installations, water lines, utility installations or other facilities that may have an impact on the Work;
- I. [Intentionally Omitted.]
- J. That no officer, director, agent or employee of Owner is personally interested directly or indirectly in this Contract or the compensation to be paid hereunder;
- K. That, except only for those representations, statements or promises expressly contained in this Contract (including the Contract Documents), no representation, statement or promise, oral or in writing, of any kind whatsoever by Owner or Owner's officers, directors, agents, employees or consultants has induced Contractor to enter into this Contract or has been relied upon by Contractor, including any with reference to: (1) the meaning, correctness, suitability, or completeness of any provisions or requirements of this Contract; (2) the nature, existence or location of materials, structures, obstructions, utilities or conditions, surface or subsurface, which may be encountered at the Site including Hazardous Materials; (3) the nature, quantity, quality or size of the materials, equipment, labor and other facilities needed for the performance of this Contract; (4) the general or local conditions which may in any way affect this Contract or its performance; (5) the price of the Contract; or (6) any

other matters, whether similar to or different from those referred to in (1) through (5) immediately above, affecting or having any connection with this Contract, the bidding thereon, any discussions thereof, the performance thereof or those employed therein or connected or concerned therewith;

- L. That Owner makes no warranty or representation whatsoever, express or implied, as to the feasibility, constructability or suitability of the Contract Documents. Contractor agrees that the Lump Sum fully and completely compensates Contractor for all Work required to implement the Contract Documents; and
- M. That the information provided in the Standard Business Background Questionnaire submitted by Contractor and related documents remains true and accurate as of the date hereof and that Contractor will immediately notify Owner if there is any material change in the information contained therein.

Each of the foregoing representations and warranties is intended to supplement, and not to limit, the other representations and the other provisions of this Contract.

Moreover, Contractor accepts the conditions in, on, and/or about the Site as they exist or may eventually be found to exist and warrants and represents that Contractor can and will perform the Contract under such conditions and that all materials, equipment, labor and other facilities required because of any Unforeseeable Conditions (physical or otherwise) shall be wholly at Contractor's own cost and expense.

Nothing in the Contract Documents or any other part of the Contract is intended as or shall constitute a representation by Owner as to the feasibility of performance of this Contract or any part thereof. Moreover, Owner does not warrant or represent by any provision of this Contract or the Contract Documents as to time for performance or completion or otherwise that the Contract may be performed or completed by the times required herein or by any other times.

Contractor further represents and warrants that Contractor was given ample opportunity and time and by means of this paragraph was requested by Owner to review thoroughly all documents forming this Contract (including the Contract Documents) prior to signing this Contract in order that Contractor might request inclusion in this Contract of any statement, representation, promise or provision which Contractor desired or on which Contractor wished to place reliance; that Contractor did so review said documents, that either every such statement, representation, promise or provision has been included in this Contract or else, if omitted, that Contractor expressly relinquishes the benefit of any such omitted statement, representation, promise or provision and is willing to perform this Contract without claiming reliance thereon or making any other claim on account of such omission.

Contractor further recognizes that the provisions of this Article 30 (though not only such provisions) are essential to Owner's consent to enter into this Contract and that without such provisions, Owner would not have entered into this Contract.

31. RISKS ASSUMED BY CONTRACTOR

Contractor assumes the following distinct and several risks, whether they arise from acts or omissions of Contractor, of Owner, or of third persons, or from any other cause, and whether such risks are within or beyond the control of Contractor and/or are known or unknown, and foreseeable or unforeseeable, as and to the extent that such risk affects the Contractor and/or the Contractor's performance of Work pursuant to this Contract:

- A. The risk of loss or damage to the Work prior to the rendition of the Certificate of Final Completion;
- B. The risk of claims, loss, liability, damage, expense, fines or penalties, just or unjust, made or asserted by third persons or assessed by courts or Governmental Authorities or entities against Contractor, Owner or any other Indemnitee on account of injuries (including wrongful death), loss, damage or liability of any kind whatsoever arising or alleged to arise out of or in connection with the performance of the Work (whether or not actually caused by or resulting from the performance of the Work) or out of or in connection with Contractor's operations or presence at or in the vicinity of the Site (including claims against Contractor or Owner for the payment of workers' compensation), whether such claims, loss, liability, damage, expense, fines or penalties are made or assessed and whether such injuries, damage, loss, liability, damage and/or expense are sustained at any time both before and/or after the rendition of the Certificate of Final Completion;
- C. The risk of loss or damage to any property of Contractor, and of claims made or asserted against Contractor, Owner or any other Indemnitee for loss or damage to any property of subcontractors, Materialmen, workers and others performing the Work, occurring at any time prior to final completion and the removal of such property from the Site or the vicinity thereof;
- D. The risk of price fluctuation;
- E. [Intentionally Omitted]
- F. Without limiting any matters or subjects covered by A through E above, the risk of claims, loss, liability, damage, expense, tax, fines or penalties, just or unjust, made or asserted by third persons or assessed by courts or governmental agencies or entities against Contractor, Owner or any other Indemnitee by reason of, or resulting in whole or in part from, Contractor's failure to comply with Legal Requirements; and
- G. Loss, liability, damage, expense, tax, fines, or penalties, just or unjust, paid or incurred by Owner by reason of Contractor's failure to keep, observe, and perform Contractor's obligations under this Contract.

Contractor shall indemnify all Indemnitees (as defined below) against all claims described in subparagraphs A through G above paid or incurred by any of the Indemnitees, or asserted against any of the Indemnitees, and for all expense incurred by any of them in the defense, settlement or satisfaction thereof, including reasonable expenses of attorneys, by reason of the acts, omissions, negligence and/or willful misconduct of Contractor, except to the extent that such indemnity would be precluded by applicable law. If so directed, Contractor shall defend against any claim (including an allegation that an Indemnitee was negligent or engaged in willful misconduct) described above by counsel approved by the Indemnitee, unless and except to the extent that it is established by an initial court order or judgment that the applicable Indemnitee was negligent or engaged in willful misconduct. Nor shall Contractor settle any such claims without the prior written consent of all Indemnitees against whom such claims have been asserted unless the effect of such settlement is to release unconditionally from complete liability every Indemnitee against whom the applicable claim was asserted.

The provisions of this Article 31 shall also be for the benefit of all Indemnitees, so that they shall have all the rights which they would have under this Article 31 if they were named at each place above at which Owner is named, including a direct right of action against Contractor to enforce the foregoing indemnity.

Neither the issuance of a Certificate of Final Completion nor the making of Final Payment shall release Contractor from Contractor's obligations under this Article 31. Moreover, neither the enumeration in this Article 31 nor the enumeration elsewhere in this Contract of particular risks assumed by Contractor or of particular claims for which Contractor is responsible, nor the securing by Contractor, Owner, or any Indemnitee of any insurance coverage contemplated under Article 34, shall be deemed (a) to limit the effect of the provisions of this Article 31 or of any other provision of this Contract relating to such risks or claims, (b) to imply that Contractor assumes or is responsible for risks or claims only of the type enumerated in this Article 31 or in any other provision of this Contract, or (c) to limit the risks which Contractor would assume or the claims for which Contractor would be responsible in the absence of such enumerations.

In this Contract "Indemnitees" means Owner; LMDC; Empire State Development Corporation ("ESDC"); PANYNJ, the Owner's Representative; and each employee, officer, director and consultant of each of them.

32. CERTAIN RIGHTS OF PORT AUTHORITY; NO OTHER THIRD PARTY RIGHTS

Owner and Contractor hereby agree that PANYNJ shall have the following rights under and with respect to this Contract—that is, the right to:

- A. have reasonable access to the Site prior to and during the Work;
- B. direct and supervise Contractor with respect to the performance of any Work around or about the property or facilities of PANYNJ.

Except as set forth in the foregoing paragraph, nothing contained in this Contract is intended for the benefit of third persons other than LMDC, the Foundation, ESDC and PANYNJ, except to the extent that the Contract specifically provides otherwise by use of the words "benefit" or "direct right of action." LMDC, the Foundation, ESDC and PANYNJ shall be third-party beneficiaries of this Contract.

33. OBLIGATIONS UPON TERMINATION

Upon any termination of Contractor's right to perform this Contract, Contractor shall:

- A. stop Work on the date and to the extent specified by Owner;
- B. take all action as necessary (or as Owner may direct) to protect and preserve all materials, equipment, tools, facilities and other property and Persons;
- C. deliver to Owner correct and complete copies of all Subcontracts, together with a complete and accurate statement of:
 - 1.) the items ordered and not yet delivered pursuant to each agreement;
 - 2.) the expected delivery dates of all such items;
 - 3.) the total cost of each agreement and the terms of payment;

- 4.) the estimated costs of canceling each agreement; and
 - 5.) sums paid under contracts and all other sums due and outstanding;
- D. and, if Owner so requests (at Owner's option), Contractor shall assign to Owner Contractor's rights under any Subcontracts designated in writing;
 - E. deliver to Owner promptly a correct and complete list of all supplies, materials, machinery, equipment and other property previously delivered or fabricated by Contractor or any subcontractor or other person or entity but not yet incorporated into the Work;
 - F. advise Owner promptly of any special circumstances which might limit or prohibit cancellation of any Subcontract;
 - G. give written notice promptly to every surety which has issued a Bond with respect to this Contract (with a copy of each such notice to Owner);
 - H. unless Owner requests an assignment thereof under clause D. above, terminate each Subcontract and make no additional agreements with subcontractors with respect to the Work or this Contract;
 - I. as directed by Owner, transfer free and clear title to Owner by appropriate instruments of title, and deliver to the Project Site (or such other place as Owner may specify), all property paid for by Owner;
 - J. notify Owner promptly in writing of any legal proceedings against Contractor by any subcontractor relating to the termination of the Work (or any Subcontracts);
 - K. deliver to Owner promptly all plans, drawings, manuals, Books and Records, and other documents which the Contract would otherwise have required Contractor to deliver to Owner prior to (or upon) Final Completion;
 - L. give written notice promptly (if required) under each policy of insurance (with a copy of each such notice to Owner), but continue to maintain all policies of insurance required under this Contract unless and until Owner directs otherwise; and
 - M. take such other actions, and execute such other documents, as Owner may reasonably request to effectuate and confirm the foregoing matters, or as may be necessary or desirable to minimize Owner's costs, and take no action which will increase any amount payable by Owner under the Contract.

34. INSURANCE PROCURED BY CONTRACTOR

As part of the Lump Sum, Contractor shall provide and maintain the insurance coverages specified in Schedule "G" hereto upon and subject to the terms and conditions set forth in Schedule "G".

As an alternative, if Owner so requests within 10 days after the signing of the Contract, Contractor shall participate in Owner's Owner Controlled Insurance Program ("OCIP") on the terms to be specified by Owner. In such event, Contractor shall give Owner a credit against the Lump Sum equal to the amount included in Contractor's Bid Form in Annex "7" for all insurance coverages specified in Schedule "G"

hereto which will be replaced by the OCIP. Schedule "G" includes a general description of the possible OCIP insurance coverages; but such coverages may differ if and when the actual OCIP is put in place.

The provisions of Schedule "B" hereto are incorporated in these General Conditions as if fully set forth herein and (without limitation) shall apply to all Damage (as defined in such Schedule "B") to the Work.

CHAPTER VI

RIGHTS AND REMEDIES

35. RIGHTS AND REMEDIES OF OWNER

Owner shall have the following rights in the event Owner shall deem Contractor guilty of a breach of any term whatsoever of this Contract:

- A. The right to take over and complete the Work or any part thereof at the expense of Contractor, either directly or through other contractors.
- B. The right to cancel this Contract as to any or all of the Work yet to be performed.
- C. The right to specific performance, an injunction or any other appropriate equitable remedy.
- D. The right to money damages.

The enumeration in this Article or elsewhere in this Contract of specific rights and remedies of Owner shall not be deemed to limit any other rights or remedies which Owner would have in the absence of such enumeration; and no exercise by Owner of any right or remedy shall operate as a waiver of any other of Owner's rights or remedies not inconsistent therewith or to estop Owner from exercising such other rights or remedies.

For the avoidance of doubt, the following will be deemed breaches of this Contract:

- E. Whether or not the time has yet arrived for performance of an obligation under this Contract:
 - 1.) Contractor gives a written statement to any representative of Owner indicating that Contractor cannot or will not perform any one or more of Contractor's obligations under this Contract;
 - 2.) any material act or omission of Contractor occurs which makes it improbable at the time that Contractor will be able to perform any one or more of Contractor's obligations under this Contract; and
 - 3.) any suspension of or failure to proceed with any part of the Work by Contractor occurs which makes it improbable at the time that Contractor will be able to perform any one or more of Contractor's obligations under this Contract;
- F. Contractor fails to commence the performance of the Work within 15 days of the date of LMDC's signing of the Trade Agreement, unless the time is extended pursuant to Article 12;

- G. Contractor abandons the Work in violation of Contractor's obligations under this Contract;
- H. Contractor fails to comply with any Legal Requirements; provided that, (except where such failure to cure will result in an imminent threat to safety or health, in which event Contractor shall comply immediately): (i) Owner has given Contractor a Notice of such noncompliance; and (ii) Contractor has failed to give Notice to Owner within five (5) days of the receipt of such Notice of noncompliance describing in reasonable detail Contractor's proposed cure and the time period in which Contractor shall effect such cure, which proposal and time period shall be subject to Owner's approval; and/or that Contractor thereafter fails to effect such cure in accordance with Contractor's proposal and time period if and as so approved by Owner;
- I. Contractor reduces Contractor's work force to a number which would be insufficient to complete the Work in accordance with the project schedule and Contractor fails, after seven (7) days' written notice from Owner, to increase the work force to a number sufficient so as to complete the Work;
- J. Contractor subcontracts Contractor's rights or obligations hereunder, except as permitted under this Contract; or Contractor assigns this Contract (or any part of Contractor's rights or obligations hereunder) in contravention of this Contract;
- K. Contractor fails to secure and maintain all insurance and Bonds required of Contractor by this Contract;
- L. Contractor does not complete the installation of the Work by the Final Completion Date (as extended under Article 12);
- M. the unpaid balance of the Lump Sum is clearly insufficient to complete the Work and to pay all liens which are Contractor's responsibility under this Contract (and not yet bonded or discharged), and Contractor fails to confirm in writing, after seven (7) days written notice from Owner, that Contractor shall complete the Work in accordance with this Contract;
- N. Contractor:
 - 1.) seeks, consents to, acquiesces in, or suffers the appointment of, a receiver of all or a material part of Contractor's property or income;
 - 2.) admits in writing Contractor's inability to pay Contractor's debts as they mature;
 - 3.) makes a general assignment for the benefit of creditors;
 - 4.) files a voluntary petition in bankruptcy, or a petition or an answer seeking reorganization or an arrangement with creditors or an advantage under any present or future federal, state or other law relating to bankruptcy, reorganization, insolvency, readjustment of debt, dissolution or liquidation or similar relief; or files an answer admitting the material allegations of a petition filed against Contractor in any proceeding under any such law; and/or

- 5.) is adjudicated an insolvent or is subject to an involuntary petition in bankruptcy, and such adjudication or filing is not set aside or terminated within thirty (30) days;
- O. An attachment is levied or a judgment is executed against all or any material part of Contractor's property or income and the same is not discharged within thirty (30) days;
- P. Any statement, certification, or representation of Contractor in this Contract, or any other document submitted by Contractor with respect to the Work or the Contract (or for purposes of securing the Contract) is false, fraudulent, or materially untrue or incorrect when made;
- Q. Contractor fails to satisfy, remove, bond, or discharge any lien if, as and when required under this Contract;
- R. There occurs a change in Contractor's financial condition which has (or clearly will have) a material adverse effect on Contractor's ability to perform its obligations under this Contract;
- S. Contractor (or the chairman or president, or any vice president, treasurer, or any shareholder owning more than twenty percent (20%) of Contractor's issued and outstanding capital stock, or the sole proprietor of Contractor or any general partner or joint venturer of Contractor) is finally determined to be guilty of a felony related or pertaining to the business activities of Contractor; and/or
- T. Except as covered by (E) through (S) above, Contractor materially fails to perform or observe any other term, covenant, condition and provision of the Contract for thirty (30) days after written notice from Owner specifying the nature of Contractor's failure; provided, however, that if curing or correcting such failure requires Work to be performed, acts to be done, or conditions to be removed which cannot be performed, done, or removed within such thirty (30) days, no breach of this Contract shall be deemed to have occurred if Contractor:
 - 1.) gives written notice to Owner within such thirty (30) days acknowledging that Contractor intends to take all actions necessary to remedy the matter involved with due diligence;
 - 2.) promptly commences to cure and correct the matter involved; and
 - 3.) cures and corrects the matter involved within a reasonable time, taking into account the relevant circumstances.

If Owner cancels this Contract as to any or all of the Work for Contractor's breach and if it is determined subsequently for any reason that a breach of the Contract did not occur or that Contractor had cured such breach in a timely manner in accordance with the Contract provisions, then Owner's cancellation of this Contract shall be deemed to have been an elective termination of the Contract pursuant to Article 16 hereof.

36. RIGHTS AND REMEDIES OF CONTRACTOR

Inasmuch as Contractor can be adequately compensated by money damages for any breach of this Contract which may be committed by Owner, Contractor expressly agrees that no default, act or omission of Owner shall constitute a material breach of this Contract entitling Contractor to cancel or rescind it or (unless Owner shall so direct) to suspend or abandon performance.

Contractor shall not bring any legal proceeding against Owner or any other Indemnitee under the Contract, or with respect to any aspect of the Work, unless Contractor commences same no later than three hundred sixty five (365) days after the earlier of: (a) the issuance of the Certificate of Final Completion; (b) the date on which Contractor's forces leave the Site after completion of Work thereon; (c) any termination of Contractor's right to perform the Work under Articles 15, 16 or 35 hereof; and/or (d) any earlier abandonment of the Project or purported termination by Contractor based upon any alleged default by Owner. This Article 36 shall not be construed to (a) revive any claim of Contractor previously waived under other provisions of the Contract; (b) release any third-party claim against an Indemnitee if and to the extent such claim is based on negligent acts or willful misconduct of an Indemnitee; or (c) to deprive Contractor of any defense in any legal proceeding commenced against Contractor by Owner or any other Person, or of any counterclaim against Owner or any other Person relating to any subject other than Owner's payments (or non-payment) to Contractor for Work after the expiration of any period (or periods) specified in this Article 36.

37. PERFORMANCE OF REMEDIAL WORK

In the exercise of its right to take over and complete any Work, or if Owner terminates this Contract by reason of a breach by Contractor, in either case for which provision is made in Article 35 hereof, Owner shall have the right to take possession of and use or permit the use of any and all plant, materials, equipment and other facilities provided by Contractor for the purpose of the Work and Contractor shall not remove any of the same from the site of the Work without express permission. Unless expressly directed to discontinue the performance of all Work, or unless Owner terminates this Contract, Contractor shall continue to perform the remainder thereof in such manner as in no way will hinder or interfere with the portions taken over by Owner.

In the certificate of total compensation earned, for which provision is made in Article 9 hereof, the certificate shall separately state the amount of Work so performed by Owner, or incurred by Owner to engage another contractor or contractors to complete any portion of the Work left unfinished by Contractor upon a termination by Owner for Contractor's breach of this Contract; shall credit to Owner the cost thereof; and shall credit to Contractor (as if Contractor had received the same) the compensation earned with respect thereto; and the difference between them shall be payable by Contractor to Owner, or vice versa as the case may be. If such difference is in its favor, Owner may deduct it from any moneys due Contractor, and if such moneys be insufficient, the balance thereof shall be payable to Owner within thirty (30) days of demand therefor (with interest on any balance not paid by such thirtieth (30th) day at the annual interest rate specified in Article 8); if in Contractor's favor, it shall constitute part of the Final Payment.

The exercise by Owner of its right to take over the Work, or to complete unfinished Work after a termination of this Contract for a breach of it by Contractor, shall not release Contractor or Contractor's sureties from any of Contractor's or such sureties' obligations or liabilities under this Contract or the Performance and Payment Bond.

38. NO ESTOPPEL OR WAIVER

Owner shall not be precluded or estopped by any acceptance, certificate or payment, final or otherwise, issued or made under this Contract or otherwise issued or made by it, the Owner's Representative, or any officer, agent or employee of Owner, from showing at any time the true amount and character of Work performed, or from showing that any such acceptance, certificate or payment is incorrect or was improperly issued or made; and Owner shall not be precluded or estopped, notwithstanding any such acceptance, certificate or payment, from recovering from Contractor any damages which it may sustain by reason of any failure on Contractor's part to comply strictly with this Contract, and any moneys which may be paid to Contractor or for Contractor's account in excess of those to which Contractor is lawfully entitled.

Neither the acceptance of the Work or any part thereof, nor any payment therefor, nor any order or certificate issued under this Contract or otherwise issued by Owner, the Owner's Representative, or any officer, agent or employee of Owner, nor any permission or direction to continue with the performance of Work, nor any performance by Owner of any of Contractor's duties or obligations, nor any aid lent to Contractor by Owner in Contractor's performance of such duties or obligations, nor any other thing done or omitted to be done by Owner, its directors, officers, agents or employees shall be deemed to be a waiver of any provision of this Contract or of any rights or remedies to which Owner may be entitled because of any breach thereof, excepting only a resolution of its directors, providing expressly for such waiver. No cancellation, rescission or annulment hereof, in whole or as to any part of the Work, because of any breach hereof, shall be deemed a waiver of any money damages to which Owner may be entitled because of such breach. Moreover, no waiver by Owner of any breach of this Contract shall be deemed to be a waiver of any other or any subsequent breach.

CHAPTER VII

MISCELLANEOUS

39. SUBMISSION TO JURISDICTION

Contractor hereby irrevocably submits to the exclusive jurisdiction of the Supreme Court of the State of New York, New York County and the United States District Court for the Southern District of New York in regard to any controversy (whether arising by reason of commencement of legal proceedings, defense, counter-claims, or otherwise) arising out of, connected with, or in any way concerning this Contract. Contractor agrees that service of process on Contractor in relation to such jurisdiction may be made, at the option of Owner, either by registered or certified mail addressed to the applicable office as provided for in Article 8 of the Trade Agreement, by registered or certified mail addressed to any office actually maintained by Contractor or by actual personal delivery to Contractor if Contractor be an individual, to any partner if Contractor be a partnership or to an officer, director or managing or general agent if Contractor be a corporation.

Such service shall be deemed to be sufficient when jurisdiction would not lie because of the lack of basis to serve process in the manner otherwise provided by law. In any case, however, process may be served as stated above whether or not it might otherwise have been served in a different manner.

40. PROVISIONS OF LAW DEEMED INSERTED

Each and every provision of law and Article required by law to be inserted in this Contract shall be deemed to be inserted herein and the Contract shall be read and enforced as though it were included therein, and if through mistake or otherwise any such provision is not inserted, or is not correctly inserted,

then upon the application of either party, the Contract shall forthwith be physically amended to make such insertion.

41. INVALID CLAUSES

If any provision of this Contract shall be such as to destroy its mutuality or to render it invalid or illegal, then, if it shall not appear to have been so material that without it the Contract would not have been made by the parties, it shall not be deemed to form part thereof but the balance of the Contract shall remain in full force and effect.

42. NON-LIABILITY OF PERSONNEL

No officer, director, agent, or employee of Owner, LMDC, the Foundation, ESDC, PANYNJ, Architect or the Owner's Representative shall be charged personally by Contractor with any liability or held liable to Contractor under any term or provision of this Contract, or because of its execution or attempted execution, or because of any breach hereof.

43. MODIFICATION OF CONTRACT

No change in or modification, termination or discharge of this Contract, in any form whatsoever, shall be valid or enforceable unless it is in writing and signed by the party to be charged therewith or such party's duly authorized representative, provided, however, that any change in or modification, termination or discharge of this Contract expressly provided for in this Contract shall be effective as so provided.

SCHEDULE A

CERTAIN LMDC REQUIREMENTS

ARTICLE I

A1.1 [omitted]

A1.2 CONTRACTOR AS INDEPENDENT CONTRACTOR. Except as set forth in Article 4 of the General Conditions and notwithstanding any other provision of this Contract, Contractor's status (and that of any subcontractor) shall be that of an independent contractor and not that of an agent or employee of Owner or LMDC. Accordingly, neither Contractor nor any subcontractor shall hold itself out as, or claim to be acting in the capacity of, an employee or agent of Owner or LMDC.

A1.3 [omitted]

A1.4 APPROVALS OR ACCEPTANCE BY Owner. Whenever action is to be taken, or approval or acceptance given, by Owner, such action, approval or acceptance shall be deemed to have been taken or given only if so taken or given by an authorized representative of Owner, by the official of Owner who signed this Contract on behalf of Owner, or by another officer or employee of Owner duly designated by such signing officer to represent Owner in connection therewith. Owner shall notify Contractor in writing of the giving or withholding of each such approval or acceptance within a reasonable period of time. Owner's acceptance or approval of any specifications, drawings, plans, reports or other materials prepared by Contractor hereunder shall in no way relieve Contractor of responsibility and/or liability for such material.

A1.5 CONFLICT-OF-INTEREST. Contractor represents and warrants that:

(a) Contractor has not now, and will not acquire, any interest, direct or indirect, present or prospective, in the project to which Contractor's work relates or the real estate which is the subject of the project, or in the immediate vicinity thereof and has not employed and will not knowingly employ in connection with work to be performed hereunder any person or entity having any such interest during the term of this Contract.

(b) No officer, employee, agent or director of Owner or LMDC shall be permitted by Contractor to share in any benefit to Contractor that arises from Contractor's work hereunder.

(c) Contractor shall not permit any officer, employee, agent or director of Owner or LMDC, or any of its subsidiaries to participate in any decision relating to this Contract which affects the personal interest of the aforementioned individuals, or the interests of any corporation, partnership, or association in which those individuals are directly or indirectly interested; nor shall any officer, agent, director or employee of Owner or LMDC be permitted by Contractor to have any interest, direct or indirect, in this Contract or the proceeds thereof.

(d) Contractor shall cause, for the benefit of Owner and LMDC, every contract or agreement with any Contractor to include the representations contained in subsections (a), (b), (c) of this Section A1.5. Contractor will take such action in enforcing such provisions as Owner may direct, or, at its option, assign such rights as it may have to Owner for enforcement by same.

A1.2 NO BROKER. Contractor represents that it has not employed any person, corporation or partnership, to solicit or procure this Contract, and has not made, and will not make, any payment or

agreement for the payment of any commission, percentage, brokerage or contingent fee, or other compensation in connection with the procurement of this Contract.

ARTICLE II

DOCUMENTS AND RECORDS

A.2.1 SUBMISSION AND PRODUCTION OF RECORDS. Please refer to Article 3 of the General Conditions.

ARTICLE III

PROVISIONS REQUIRED BY LAW

A3.1 CONTRACTOR TO COMPLY WITH LEGAL REQUIREMENTS. Contractor in performing its obligations and in preparing all documents required under this Contract shall comply with Legal Requirements. All provisions required by such Legal Requirements to be included in this Contract shall be deemed to be included in this Contract with the same effect as if set forth in full. Such laws shall include, but are not limited to, the following laws referenced in this Section A3.1.

Contractor shall comply with all applicable HUD guidelines relating to Community Development Block Grant ("CDBG") funding, as modified or waived with respect to LMDC and published by HUD at 67 F.R. 12707 and 67 F.R. 36017. Contractor shall comply with applicable provisions of the Housing and Community Development Act of 1974, as amended, section 434 of the Departments of Veterans Affairs and Housing and Urban Development, and Independent Agencies Appropriations Act, 2002 (Public Law 107-73), the 2001 Emergency Supplemental Appropriations Act for Recovery from and Response to Terrorist Attacks on the United States (Public Law 107-38), and other applicable laws, including but not limited to:

- (a) Anti-discrimination and Labor Laws, including but not limited to:
 - (1) The Housing and Urban Development Act of 1968 (12 U.S.C. § 1701u) as supplemented by HUD regulations (24 CFR part 135) with respect to efforts to provide to the greatest extent feasible employment and other economic opportunities to low- and very low-income individuals;
 - (2) Section 109 of Title I of the Housing and Community Development Act of 1974, as amended;
 - (3) Nondiscrimination in program administration and activities (29 U.S.C. § 794, 42 U.S.C. § 5309(a) and § 6101 *et seq.*);
 - (4) Title VI of the Civil Rights Act of 1964 (42 U.S.C. § 2000d *et seq.*);
 - (5) Title VIII of the Civil Rights Act of 1968, as amended;
 - (6) Section 504 of the Rehabilitation Act of 1973;
 - (7) The Age Discrimination Act of 1975;
 - (8) Executive Order 11063;

- (9) Executive Order 11246 (as amended by Executive Orders 11375, 11478, 12106 and 12086)
- (10) The Fair Housing Act (42 U.S.C. §§ 3601-20);
- (11) The Copeland "Anti-Kickback" Act (18 U.S.C. § 874) as supplemented in the U.S. Department of Labor ("DOL") regulations (29 CFR parts 1, 3, 5 and 7) with respect to all contracts for construction or repair;
- (12) The Davis-Bacon Act (42 U.S.C. § 5310, 40 U.S.C. §§ 276a to 276a-7), as supplemented by DOL regulations (29 CFR part 5), with respect to construction contracts in excess of \$2000; and
- (13) Sections 103 and 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. §§ 327-330) as supplemented by DOL regulations (29 CFR part 5) with respect to construction contracts in excess of \$2000, and in excess of \$2500 for other contracts which involve the employment of mechanics or laborers.

(b) Safe and Accessible Facilities and Services. Contractor must provide safe and accessible facilities and services in accordance with applicable law, including but not limited to:

- (1) Americans with Disabilities Act (42 U.S.C. §§ 4151-4157);
- (2) The Lead-Based Paint Poisoning and Prevention Act (42 U.S.C. §§ 4821-4846);
- (3) All applicable standards, orders, or requirements issued under section 306 of the Clean Air Act (42 U.S.C. § 1857(h)), section 508 of the Clean Water Act (33 U.S.C. § 1368), Executive Order 11738, and Environmental Protection Agency regulations (40 CFR part 15); and
- (4) Mandatory standards and policies relating to energy efficiency which are contained in the state energy conservation plan issued in compliance with the Energy Policy and Conservation Act (Pub. L. 94-163, 89 Stat. 871) (53 FR 8068, 8087, Mar. 11, 1988, as amended at 60 FR 19639, 19642, Apr. 19, 1995).

(c) Privacy Act. Contractor must comply with the Privacy Act (5 U.S.C. § 552a) and ensure that all personal information obtained from the public is handled in compliance with the Privacy Act. Contractor must ensure the minimum required access to any such personal information collected or received from the public and will hire a bonded clerk to ensure compliance with the Privacy Act as to any such information in its possession.

(d) Drug Free Workplace. Contractor shall or shall continue to provide and maintain a drug-free workplace by implementing a workplace drug policy that includes:

- (1) Publishing a statement notifying employees that the unlawful manufacture, distribution, dispensing, possession, or use of a controlled substance is prohibited in the grantee's workplace and specifying the actions that will be taken against employees for violation of such prohibition;
- (2) Establishing an ongoing drug-free awareness program to inform employees about (i) the dangers of drug abuse in the workplace, (ii) the grantee's policy of

maintaining a drug-free workplace, (iii) any available drug counseling, rehabilitation, and employee assistance programs; and (iv) the penalties that may be imposed upon employees for drug abuse violations occurring in the workplace;

- (3) Making it a requirement that each employee to be engaged in the performance of the grant be given a copy of the statement required by subparagraph (1) herein;
- (4) Notifying the employee in the statement required by subparagraph (1) herein that, as a condition of employment under the grant, the employee will: (i) abide by the terms of the statement; and (ii) notify the employer in writing of his or her conviction for a violation of a criminal drug statute occurring in the workplace no later than five calendar days after such conviction;
- (5) Notifying Owner, in writing, within five (5) calendar days after receiving notice under subparagraph 4(ii) from an employee or otherwise receiving actual notice of such conviction; and
- (6) Taking one of the following actions, within 30 calendar days of receiving notice under subparagraph 4(ii), with respect to any employee who is so convicted: (i) taking appropriate personnel action against such an employee, up to and including termination, consistent with the requirements of the Rehabilitation Act of 1973, as amended; or (ii) requiring such employee to participate satisfactorily in a drug abuse assistance or rehabilitation program approved for such purposes by a Federal, State, or local health, law enforcement, or other appropriate agency.

(e) Anti-Lobbying. To the best of Contractor's knowledge and belief:

- (1) No Federal appropriated funds have been paid or will be paid, by or on behalf of it, to any person for influencing or attempting to influence an officer or employee of any agency, a member of Congress, an officer or employee of Congress, or an employee of a member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement;

If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a member of Congress, an officer or employee of Congress, or an employee of a member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, it will complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions; and

It will require that the certification language of this paragraph (e) be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.

(f) Section 3. The Work to be performed under this Contract is a project assisted under a program providing direct Federal financial assistance from HUD and is subject to the requirements of Section 3 of the Housing and Urban Development Act of 1968, as amended (12 U.S.C. § 1701u). Contractor shall comply with the following provisions of Section 3:

- (1) The Work to be performed under this Contract is subject to the requirements of Section 3 of the Housing and Urban Development Act of 1968, as amended, 12 U.S.C. § 1701u (Section 3). The purpose of Section 3 is to ensure that employment and other economic opportunities generated by HUD assistance or HUD-assisted projects covered by Section 3, shall, to the greatest extent feasible, be directed to low- and very low-income persons, particularly persons who are recipients of HUD assistance for housing.
- (2) Contractor agrees to comply with HUD's regulations in 24 CFR part 135, which implement Section 3. As evidenced by Contractor's execution of this contract, Contractor certifies that Contractor is under no contractual or other impediment that would prevent Contractor from complying with the part 135 regulations.
- (3) Contractor agrees to send to each labor organization or representative of workers with which Contractor has a collective bargaining agreement or other understanding, if any, a notice advising the labor organization or workers' representative of Contractor's commitments under this Section 3 clause, and will post copies of the notice in conspicuous places at the Project Site where both employees and applicants for training and employment positions can see the notice. The notice shall describe the Section 3 preference, shall set forth minimum number and job titles subject to hire, availability of apprenticeship and training positions, the qualifications for each; and the name and location of the person(s) taking applications for each of the positions; and the anticipated date the Work shall begin.
- (4) Contractor agrees to include this Section 3 clause in every subcontract subject to compliance with regulations in 24 CFR part 135, and agrees to take appropriate action, as provided in an applicable provision of the subcontract or in this section 3 clause, upon a finding that the subcontractor is in violation of the regulations in 24 CFR part 135. Contractor will not subcontract with any Contractor where Contractor has notice or knowledge that the Contractor has been found in violation of the regulations in 24 CFR part 135.
- (5) Contractor will certify that any vacant employment positions, including training positions, that are filled (1) after Contractor is selected but before the contract is executed, and (2) with persons other than those to whom the regulations of 24 CFR part 135 require employment opportunities to be directed, were not filled to circumvent Contractor's obligations under 24 CFR part 135.
- (6) Noncompliance with HUD's regulations in 24 CFR part 135 may result in sanctions, termination of this Contract for default, and debarment or suspension from future HUD assisted contracts.
- (7) With respect to Work performed in connection with Section 3 covered Indian housing assistance, section 7(b) of the Indian Self-Determination and Education Assistance Act also applies to the work to be performed under this Contract.

Section 7(b) requires that to the greatest extent feasible (i) preference and opportunities for training and employment shall be given to Indians, and (ii) preference in the award of contracts and subcontracts shall be given to Indian organizations and Indian-owned Economic Enterprises. Contractor is subject to the provisions of Section 3 and Section 7(b) and agrees to comply with Section 3 to the maximum extent feasible, but not in derogation of compliance with Section 7(b).

- (8) Contractor will be required to report on its efforts and the results of its efforts to comply with Section 3 on a quarterly basis, utilizing the Section 3 Workforce Report attached hereto as Exhibit A-1 to Schedule A.

(g) September 11, 2001 Recovery. Contractor will make efforts to employ for the Work individuals affected by September 11, 2001, specifically, but not limited to, individuals who (a) lost wages from their work below Houston Street due to September 11, 2001, or (b) lived below Houston Street on September 11, 2001 or currently reside there. Contractor shall submit quarterly reports to Owner substantially in the form attached hereto as Exhibit A-3, regarding its efforts to satisfy its obligations under this clause (g).

A3.2 CONTRACTOR TO OBTAIN PERMITS, ETC. Except as otherwise instructed in writing by Owner, Contractor shall obtain and comply with all legally required licenses, consents, approvals, orders, authorizations, permits, restrictions, declarations and filings required to be obtained by Owner in connection with the Work.

ARTICLE IV

OTHER STANDARD PROVISIONS

A4.1 ASSIGNMENT BY OWNER. Owner may transfer and assign any and all of its rights and obligations under this Contract, including transferring and assigning its rights to Contractor's performance of any or all Work or Services under the Contract Documents, to any partnership, firm, limited liability company, corporation, Governmental Authority, or department or other entity (including the Foundation, construction general contractor or guaranteed maximum price contractor for the Memorial, Memorial Museum, and related facilities. Owner shall give Contractor written notice of any such transfer and assignment. Such transfer shall relieve Owner of any liability or obligation under this Contract from and after the date of such assignment and transfer.

A4.2 GOVERNING LAW. This Contract shall be construed and enforced in accordance with the laws of the State of New York (without giving effect to principles of conflicts of laws).

A4.3 ENTIRE AGREEMENT/AMENDMENT. This Contract constitutes the entire Contract between the parties hereto and no statement, promise, condition, understanding, inducement, or representation, oral or written, expressed or implied, which is not contained herein shall be binding or valid and this Contract shall not be changed, modified or altered in any manner except by an instrument in writing executed by the parties hereto.

A4.4 CONFIDENTIALITY. Contractor hereby agrees that all data, recommendations, reports and other materials developed in the course of any study or work performed in connection with this Contract are strictly confidential between Contractor and Owner and Contractor may not at any time reveal or disclose such data, recommendations or reports in whole or in part to any third party without first obtaining permission from Owner. Notwithstanding the preceding sentence, Contractor shall

cooperate fully with such third parties as Owner may designate by written request. Such cooperation shall include making available to such parties, data, information and reports used or developed by Contractor in connection with this Contract.

A4.5 ASSISTANCE. Contractor hereby agrees to assist Owner in its efforts to include the public in the development of the Work, which may include presentations to the local community board(s) and other local civic and community groups and incorporating comments from these groups in the implementation of the Work.

A4.6 LMDC RECOGNITION. Contractor hereby agrees to insure recognition of the role of HUD and of LMDC in the manner provided in Exhibit A-2 attached hereto.

A4.7 SUBCONTRACT PROVISIONS. Contractor shall include the provisions of Articles II and III and this Section A4.7 of this Schedule "A" in every Subcontract or purchase order it awards, specifically or by reference, so that such provisions will be binding upon each of the subcontractors and their subcontractors and vendors.

A4.8 ENVIRONMENTAL CONDITIONS.

(a) Contractor agrees to comply with all Environmental Laws.

(b) Additional Construction Measures. Contractor agrees to meet all commitments regarding environmental performance and historic preservation as set forth in Exhibit A-4 hereto.

A4.9 MISCELLANEOUS. This Schedule A supplements (and is not intended to limit or restrict) the other provisions of the Contract. The parties agree that this Schedule A shall be controlling in the event of any inconsistencies or conflicts between the terms of this Schedule A and any other part of this Contract, subject to Article 20 and Schedule "F" hereof.

EXHIBIT A-1

Section 3 Workforce Report

Type of Report (Check One) // Total Workforce // Contract Specific Workforce							
Type of Service (Check One) // Professional, Construction, Consultant // Service/ Consultant // Commodities							
Contractor Name:				Contractor Start Date:			
Address:				Reporting Period:			
// Quarterly Report // Semi-Annual Report							
Telephone Number				Project Name:			
Federal ID NO:				Project Location:			
Check One: // Prime Contractor // Contractor				County:		Zip:	
Contract Number:				Product/Services Provided:			
Contract Amount:							
Number of Employees							
Federal Occupational Category	Total Number of Employees Working on this Project	Low Income Employees Residing in Metropolitan Area	Very Low Income Employees Residing in Metropolitan Area	Low Income Employees Residing in Service Area or Neighborhood in which Project is Located	Very Low Income Employees Residing in Service Area or Neighborhood in which Project is Located	Low Income Employees Participating in Other HUD Programs	Very Low Income Employees Participating in Other HUD Programs
Official/Administrator							
Professionals							
Technicians							
Sales Workers							
Office & Clerical							
Craft Workers							
Operatives							
Laborers							
Service Workers							
TOTALS							
<p>Certification:</p> <p>I, _____ (Print Name) the, _____ (Title) of _____ (Print Company Name) do certify that (i) I have read this Workforce Utilization Report on Section 3 and (ii) to the best of my knowledge, information, and belief the information herein is complete and accurate.</p> <p>Signature: _____</p>							

EXHIBIT A-2

LMDC and HUD Recognition

Please find below guidelines for recognition of HUD and LMDC with respect to the Work. Note, any public information and all of the items below must be approved by LMDC in advance of publication or posting.

Written documents

All written documents for public release must include the following language, unless otherwise specified in writing by LMDC:

1. "This project is made possible by funding from the Lower Manhattan Development Corporation, which is funded through Community Development Block Grants from the U.S. Department of Housing and Urban Development. This project was partially funded through a grant from the USDA Forest Service."
2. Written documents should also include the LMDC and Owner logo and the names of the Governor, Mayor, Chairman of LMDC, President of LMDC and Chairman and President of Owner.

Internet information and e-mail information

1. Internet information must include all of the items required for written documentation and a link to LMDC's website.

Offices open to the public providing services funded by LMDC

1. All offices must include a sign including all of the items required for written documentation.

Construction Signs

1. All construction signs must include a sign including all of the items required for written documentation.
2. All construction signs must also include the name of the project, an expected end date for the Work, the name of LMDC, Owner and Contractor, and a phone number for the public to call to obtain information about the Work. This must be a phone number maintained by Owner, Contractor or one of the subcontractors.

EXHIBIT A-3

Workforce Utilization Report on Employees Impacted by September 11, 2001

Type of Report (Check One) // Total Workforce // Contract Specific Workforce	
Type of Service (Check One) // Professional, Construction, Consultant // Service/ Consultant // Commodities	
Contractor Name:	Contractor Start Date:
Address:	Reporting Period:
	// Quarterly Report // Semi-Annual Report
Telephone Number	Project Name:
Federal ID NO:	Project Location:
Check One: // Prime Contractor // Contractor	County: Zip:
Contract Number:	Product/Services Provided:
Contract Amount:	

Number of Employees

Federal Occupational Category	Total Number of Existing Employees Working on this Project	Total Number of New Employees Hired for this Project	Existing Employees that Lost Job or Wages as a Result of September 11, 2001	New Employees that Lost Job or Wages as a Result of September 11th, 2001	Low-Income Existing and New Employees that Lost Job or Wages as a Result of September 11th, 2001	Moderate-Income Existing and New Employees that Lost Job or Wages as Result of September 11th, 2001	Low-Income Existing and New employees that live below Houston Street	Moderate-Income Existing and New Employees that Live Below Houston Street
Official/Administrator								
Professionals								
Technicians								
Sales Workers								
Office & Clerical								
Craft Workers								
Operatives								
Laborers								
Service Workers								
TOTALS								

Certification:

I, _____ (Print Name) the, _____ (Title) of _____ (Print Company Name) do certify that (i) I have read this Workforce Utilization Report on Employees Impacted by September 11, 2001 and (ii) to the best of my knowledge, information, and belief the information herein is complete and accurate.

Signature: _____

EXHIBIT A-4

GUIDANCE ON ENVIRONMENTAL AND HISTORIC PRESERVATION REQUIREMENTS FOR WORLD TRADE CENTER MEMORIAL AND CULTURAL PROGRAM

This document is intended to constitute guidance on the various environmental and historic preservation requirements applicable to the World Trade Center Memorial and Cultural Program, but may not be substituted for the actual requirements set forth in the documents described in A. below.

- A. Any construction manager or contractor providing services for a project that is part of the World Trade Center Memorial and Cultural Program will be expected to meet all commitments included in or as mandated by the following documents, as relevant to the scope of services of such construction manager or contractor:
- the World Trade Center Memorial and Redevelopment Plan Record of Decision and Lead Agency Findings Statement (the "ROD"), dated June 2004¹, the appendices of which include the World Trade Center Memorial and Redevelopment Plan Programmatic Agreement, dated April 22, 2004 (the "Programmatic Agreement")² and the Environmental Performance Commitments³
 - the Coordinated Construction Act for Lower Manhattan (the "Act"), attached hereto as Exhibit A-4-1
 - the Sustainable Design Guidelines for the World Trade Center Memorial Project (the "Sustainable Design Guidelines")⁴, which are interpreted and developed in the Sustainable Design Guidelines Reference Manual for WTC Redevelopment Projects, dated March 25, 2005 (the "Reference Manual")⁵
- B. The key commitments contained in the documents set forth in A. above are summarized below by category. Commitments with greater specificity or more stringent requirements govern commitments of a more general nature.

Access and Circulation

- (1) Coordinate with the Lower Manhattan Construction Command Center ("LMCCC") with regard to vehicular traffic from construction activities
- (2) Maintain access to local business and points of interests to the greatest extent practicable

¹ The ROD is accessible on the Lower Manhattan Development Corporation ("LMDC") website at http://www.renewnyc.com/plan_des_dev/rod_contents.asp, and the ROD with its appendices is incorporated herein by reference.

² The Programmatic Agreement is accessible on LMDC's website at http://www.renewnyc.com/content/pdfs/programmatic_agreement_5704.pdf.

³ The EPCs are accessible on LMDC's website at http://www.renewnyc.com/content/pdfs/EPC_Table.pdf.

⁴ The Sustainable Design Guidelines are accessible on LMDC's website at http://www.renewnyc.com/content/pdfs/Memorial_Sustainable_Design_Guidelines.pdf, and they are incorporated herein by reference.

⁵ The Reference Manual is accessible on LMDC's website at http://www.renewnyc.com/plan_des_dev/design_guidelines_manual.asp, and is incorporated herein by reference.

- (3) Arrange staging areas for trucks that would limit the impact on adjoining neighborhoods
- (4) Develop and implement project-specific pedestrian and vehicular maintenance and protection plan
- (5) Promote public awareness of access and traffic matters through mechanisms such as signage, a telephone hotmail, and web site updates
- (6) Ensure sufficient alternate access to streets, buildings, and temporary and permanent WTC PATH Terminal during construction period
- (7) Communicate regularly with New York City Department of Transportation and participate in its construction coordination efforts

Air Quality

- (8) Connect construction engines which operate in a fixed or temporarily fixed position (e.g., welding machines, compressors) to a grid-based power source, if available, in order to eliminate on-site diesel exhaust to the maximum extent feasible, as discussed in section 3.2.20 of the ROD
- (9) Use construction equipment with newer engines and lower diesel particulate emissions to meet that goals set forth in section 3.2.20 of the ROD
- (10) Implement the most feasible technology(ies) for the reduction of nitrogen oxide emissions from construction equipment for the project to meet the requirements of section 3.2.20 of the ROD with respect to all work to be performed by the contractor or construction manager
- (11) All off-road construction equipment of 50 horsepower or greater must be retrofitted to include oxidation catalysts, particulate filters or other best available control technology to reduce air emissions (including, without limitation, particulate emissions) to the lowest extent practicable and must utilize ultra-low sulfur diesel fuel as mandated by the Act and as discussed in section 3.2.20 of the ROD
- (12) Limit unnecessary idling times to 3 minutes
- (13) Consider bio-diesel fuel as an alternative to pure diesel fuel
- (14) Locate diesel powered engines away from fresh air intakes
- (15) Prior to construction activities, prepare and implement a site-specific health and safety plan, dust control measures, and contaminated soil and groundwater management plans pursuant to section 3.2.9 of the ROD, and a materials staging and construction access plan pursuant to SEQ-5 of the Sustainable Design Guidelines⁶ (truck staging zones are to be placed for minimum disruption and impact)
- (16) Control dust related to the construction site through a Soil Erosion and Sediment Control Plan that include, among other things: spraying of a suppressing agent on dust pile (non-hazardous, biodegradable); containment of fugitive dust; and adjustment for meteorological conditions as appropriate

⁶ Construction manager or contractor is encouraged to review applicable provisions of the Reference Manual regarding requirements set forth in the Sustainable Design Guidelines.

Noise and Vibration

- (17) As required under SEQ-5 of the Sustainable Design Guidelines, assist in the development and implementation of LMDC's Construction Environment Plan which reduces pollution and noise from construction activities and vehicles, including source reduction measures (e.g., noise barriers), equipment alternatives (including low noise emission level equipment); receptor reduction measures; alternative construction techniques; construction scheduling coordination with other Lower Manhattan construction activities to avoid or minimize noise and vibration; and contingency measures if established criteria/limits are exceeded
- (18) Perform outdoor construction activities between 7 A.M. and 6 P.M. on Monday through Saturday, as practicable in accordance with applicable practices and requirements
- (19) During pre-construction design review, take into account noise reduction features and technology, especially with regards to areas in the Memorial important for serenity and quiet, in furtherance of the noise reductions measures and goals in the ROD and Sustainable Design Guidelines. The goal for operation of the Memorial is a noise attenuation of 5 dBA and the goal for the operation of the Memorial Museum is a noise attenuation of 30-40 dBA
- (20) Coordinate with the LMCCC in scheduling/sequencing individual project construction activities so as to avoid or minimize adverse impacts; use noise barriers where practicable
- (21) Consider the conditions of surrounding buildings, structures, infrastructure and utilities in planning and conducting construction activities

Economic Effects

- (22) To extent practicable, minimize disruptions to businesses in general area of Project site
- (23) Add appropriate signage and way finding for affected businesses and amenities

Cultural and Historic Resources

- (24) In order to avoid or minimize adverse effects to historic resources within and adjacent to the project site (as defined by the ROD), all construction activities must, among other things, adhere to LMDC's Construction Protection Plan (to be provided) as referenced in section 3.2.20 of the ROD and comply with those measures identified in Stipulations 2, 3, 5, 6 and 7 of the Programmatic Agreement that are applicable to construction activities, including the implementation of mitigation and monitoring plans for historic and archaeological resources
- (25) Coordination with other Lower Manhattan construction projects to avoid or minimize interruption in access to cultural and historic sites
- (26) Subject to the requirements of the Construction Protection Plan, monitor noise and vibration during construction at or near such sites as appropriate

Environmental Design/Sustainable Development

- (27) During pre-construction design review, take into account the requirements and goals of the Sustainable Design Guidelines, and consult with LMDC regarding the Comprehensive Resource

Management Plan, Water Management Plan, Energy Management Plan, Materials Management Plan, the Indoor Air Quality Management Plan, and the lighting quality requirements of IEQ-12

- (28) As required under MEQ-2, MEQ-3, MEQ-4, MEQ-5, MEQ-6, MEQ-7, SEQ-6, SEQ-11 and IEQ-5 of the Sustainable Design Guidelines:
- A. prepare and implement a Construction Waste Management and Recycling Plan;
 - B. implement those elements of the Materials Management Plan regarding salvage and reuse of used building materials, the use of recycled-content and/or renewable building materials, and the use of FSC certified wood materials;
 - C. prepare and implement a Construction Stormwater Pollution Prevention Plan; and
 - D. prepare and implement a Construction Indoor Air Quality Management Plan
- (29) In accordance with MEQ-5, utilize local/regional materials in conjunction with the Materials Management Plan for the Project; use a minimum of 20% of all building materials (based on cost) that are manufactured within a 500 mile radius of the site; seek to utilize materials "extracted" within a 500 mile radius where possible
- (30) Conserve, reuse and recycle materials and resources during construction and recommend measures for environmentally-friendly operations & maintenance

EXHIBIT A-4-1

COORDINATED CONSTRUCTION ACT FOR LOWER MANHATTAN
[EXPIRES AND REPEALED DEC 31, 2014]

§ 1. [Expires and repealed Dec 31, 2014] Short title

This act shall be known and may be cited as the "Coordinated Construction Act for Lower Manhattan".

§ 2. [Expires and repealed Dec 31, 2014] Legislative findings

The city and state of New York have a compelling interest in the redevelopment of lower Manhattan, the area of New York City that suffered most grievously from the attack on the World Trade Center on September 11, 2001.

The legislature recognizes the historic importance of lower Manhattan to the economy of the city, state and region. Lower Manhattan is the third largest business district in the nation. Before the attack, the area accounted for more than \$ 114 billion in economic output and about 15 percent of the city's tax revenues. On September 11, 2,792 lives were lost, and lower Manhattan sustained losses of more than \$ 80 billion. The economic losses have continued in the ensuing years. The legislature recognizes that decisive action is needed to prevent these losses from generating a devastating downward spiral and to assure that lower Manhattan retains and even enhances its position as a vital contributor to the economy of the city, state, and region.

In response to the damage caused by the attack, the federal government thus far has committed approximately \$ 6 billion over a 10-year period for redevelopment projects in lower Manhattan. The public interest will be served by ensuring that these projects, as well as any projects in the area funded by the state and city governments, are constructed quickly, safely, fairly, and cost effectively. Assuring that public funds are spent wisely will, in turn, encourage private sector firms now located in lower Manhattan to remain, and stimulate other firms to invest in the area.

The primary purpose of this legislation in promoting the fast, safe, and fair redevelopment of lower Manhattan is to allow the city to adopt procedures that have been used effectively by state agencies and authorities. These procedures include those that the city now cannot use at all (such as bidding jointly with the utilities and establishing goals for participation of minority- and women-owned contractors) and those that the city now can use only under limited circumstances, such as purchasing cooperatively with other agencies. In a few instances, the legislation affects the procedures of state as well as city agencies, allowing them to adopt procedures that have been effective for public benefit corporations such as the Metropolitan Transportation Authority (MTA). The legislation allows the city and state agencies to prequalify bidders under defined criteria including, for projects over \$ 1 million, having a successful New York state approved apprenticeship program for at least three years.

By allowing city agencies to plan their work with the utilities and establish goals for participation in accordance with article 15-A of the executive law, the legislation will promote speed and fairness, reduce public disruption, and lower costs. By allowing city and state agencies to prequalify bidders on the basis of defined criteria, the legislation will again promote speed but also ensure that it cannot be purchased at the price of quality or safety for workers and community residents. Safety is also enhanced by including in the statute the public agencies' agreement to use ultra-low sulfur diesel fuel, thereby reducing harmful emissions and protecting our environment.

Ultimately, these provisions will help the public and private sectors to bring to the redevelopment of lower Manhattan the same sense of purpose, urgency, and harmony that they brought to the clean up at the World Trade Center site.

§ 3. [Expires and repealed Dec 31, 2014] Definitions

As used or referred to in this act, unless a different meaning clearly appears from the context:

a. "Public agency" shall mean any agency of the state of New York or the city of New York and the Metropolitan Transportation Authority.

b. "Lower Manhattan" shall mean the area to the south of and within the following lines: a line beginning at a point where the United States pierhead line in the Hudson river as it exists now or may be extended would intersect with the southerly line of West Houston street in the borough of Manhattan extended, thence easterly along the southerly side of West Houston street to the southerly side of Houston street, thence easterly along the southerly side of Houston street to the southerly side of East Houston street, thence northeasterly along the southerly side of East Houston street to the point where it would intersect with the United States pierhead line in the East river as it exists now or may be extended, including tax lots within or immediately adjacent thereto.

c. "Lower Manhattan redevelopment project" shall mean any project in lower Manhattan that is funded in whole or in part with federal funding, or any project intended to improve transportation between lower Manhattan and the two air terminals in the city of New York known as LaGuardia Airport and John F. Kennedy International Airport, or between lower Manhattan and the air terminal in Newark known as Newark Liberty International Airport, and that is funded in whole or in part with federal funding.

d. "Project" shall include construction and reconstruction, rehabilitation, restoration, and modernization of buildings, structures and monuments and memorials on land or in water, including landfill or any pilings, piers, platforms, or decks, streets, transit facilities, ferry terminals, bikeways, parks and park facilities, telecommunication facilities, parking facilities, system replacements, and landscaping, and in addition, any dredging or filling or other activities related thereto.

§ 4. [Expires and repealed Dec 31, 2014]

a. Notwithstanding any general, special or local law or rule or regulation to the contrary, a public agency awarding a contract for a lower Manhattan redevelopment project may establish guidelines governing the qualifications of bidders entering into contracts for a lower Manhattan redevelopment project. If a public agency maintains an appropriate list of qualified bidders, the bidding shall be restricted to those who have qualified prior to the receipt of bids according to standards fixed by the public agency. In determining whether a prospective bidder qualifies for inclusion on a list of pre-qualified bidders, the public agency shall consider the experience and record of performance of the prospective bidder in the particular type of work; as well as (1) the prospective bidder's ability to undertake the particular type and complexity of work; (2) the financial capability, responsibility and reliability of the prospective bidder for this type and complexity of work; (3) the record of the prospective bidder in complying with existing labor standards and maintaining harmonious labor relations; (4) the prospective bidder's compliance with equal employment opportunity requirements and anti-discrimination laws, and commitment to working with minority and women-owned businesses through joint ventures or subcontractor relationships; and (5) the record of the prospective bidder in protecting the health and safety of workers on construction projects and job sites as demonstrated by the prospective bidder's experience modification rate for each of the last three years. In addition to such considerations, for contracts that exceed one million dollars, the public

agency shall consider the prospective bidder's commitment to training a skilled workforce through apprenticeship agreements appropriate for the type and scope of work to be performed, that have been registered with and approved by the commissioner of the department of labor, and that have been in successful operation for a period of not less than three years. Successful operation shall be defined as placement of 75 percent of all graduates in an appropriate trade.

The public agency shall, not less than annually, publish in a newspaper of general circulation in the city of New York, an advertisement requesting prospective bidders to submit qualification statements. Lists of pre-qualified bidders shall be reviewed and updated not less than annually by the public agency. Lists of pre-qualified bidders may be established on a project-specific basis. Prequalified lists shall include all bidders that qualify; provided, however, that any such list shall have no less than five bidders. The public agency procedures for prequalifying bidders shall include an appeals process for those denied a place on a pre-qualified list. The public agency may move forward on the contract award during such appeals.

Unless otherwise specifically provided in this act, the city of New York shall comply with all the requirements for procurement, including for appeals of agency decisions, that are set forth in chapter 13 of the New York city charter and in the rules of the New York city procurement policy board.

b. Notwithstanding any general, special or local law or rule or regulation to the contrary, for lower Manhattan redevelopment contracts the public agency shall require contractors and subcontractors to have, prior to entering into such contracts, a record of maintaining harmonious labor relations, a commitment to working with minority- and women-owned businesses through joint ventures or subcontractor relationships, and a record of protecting the health and safety of workers on construction projects and job sites demonstrated by their experience modification rates for each of the last three years. In addition, for lower Manhattan redevelopment contracts that exceed one million dollars, the public agency shall require contractors and subcontractors to have, prior to entering into such contracts, apprenticeship agreements appropriate for the type and scope of work to be performed, that have been registered with and approved by the commissioner of the department of labor, and that have been in successful operation for a period of not less than three years.

c. Contracts awarded pursuant to this act are contracts subject to the requirements of article 15-A (or its successor) of the executive law. For the award of contracts pursuant to this act, the city of New York shall be considered a state agency under article 15-A (or its successor) of the executive law for purposes of establishing goals for the participation of certified minority- and women-owned business enterprises in contracts for lower Manhattan redevelopment projects, as defined in subsections c and d of section 3 of this act and including contracts for the design of projects.

d. Notwithstanding any general, special or local law or rule or regulation to the contrary, to facilitate the timely and cost effective completion of utility work in lower Manhattan, the public agency may include in any contract for a lower Manhattan redevelopment project any work that it deems necessary or desirable for the completion of such project that requires the maintenance, support, protection or other accommodation of energy, telecommunications or other private facilities or structures not publicly owned which are located within, traversing or adjacent to the construction area of such project, whether above, below or at ground level, including the removal, relocation, alteration, replacement, reconstruction or improvement of such facilities or structures, provided that the costs of work performed pursuant to this paragraph, including any incremental or administrative costs attributable to such work, shall not be borne by such public agency except as otherwise provided by chapter 357 of the laws of [fig 1] 1988. If a public agency includes such work in a contract pursuant to this paragraph, the public agency shall award the contract to the lowest responsible bidder based upon the combined cost of the public work and the utility work and the public agency shall be reimbursed by the entity responsible for the utility work for any incremental cost increase equal to the difference between the cost of the public agency work in the overall

low bidder and the cost of the public agency work of the lowest bidder for the public agency work alone. However, if the cost of the public agency work of the lowest bidder for the public agency work alone is more than twenty percent below the average of the next two lowest bids for the public agency work, then the public agency shall award the contract to the lowest responsible bidder for the public agency work alone. In the event that the utility work is not included in the public agency's contract, nothing in this paragraph shall prevent the public agency from including provisions in its contracts requiring contractors to engage in alternate methods of dispute resolution regarding utility work. Further, nothing in this subdivision is to be deemed to alter, modify, amend, or revoke any of the rules presently existing that govern the responsibility between the Metropolitan Transportation Authority and the public utilities for the payment of any of the costs required for the maintenance, support, protection, or other accommodation of any energy, telecommunication, or other private facilities or structures.

e. Notwithstanding any general, special or local law or rule or regulation to the contrary, a public agency shall require contractors and subcontractors to use only ultra-low sulfur diesel fuel to power the diesel-powered non-road vehicles with engine horsepower (HP) rating of [fig 1] 50 HP and above used on lower Manhattan redevelopment projects and [fig 2] to reduce the emission of pollutants by requiring retrofitting such non-road vehicles with oxidation catalysts, particulate filters, or technology [fig 3] that achieves lowest particulate matter emissions. For purposes of this subdivision, the following terms shall have the following meanings:

(1) "Ultra-low sulfur diesel fuel" means diesel fuel that has a sulfur content of no more than fifteen parts per million.

(2) "Nonroad engine" means an internal combustion engine (including the fuel system) that is not used in a motor vehicle or a vehicle used solely for competition, or that is not subject to standards promulgated under section 7411 or section 7521 of title 42 of the United States code, except that this term shall apply to internal combustion engines used to power generators, compressors or similar equipment used in any construction program or project.

(3) "Nonroad vehicle" means a vehicle that is powered by a nonroad engine, fifty horsepower and greater, and that is not a motor vehicle or a vehicle used solely for competition, which shall include, but not be limited to, excavators, backhoes, cranes, compressors, generators, bulldozers and similar equipment.

(4) "Public agency" means:

- (i) any agency of the state of New York or the city of New York;
- (ii) the Metropolitan Transportation Authority; and
- (iii) the Port Authority of New York and New Jersey.

(5) "Lower Manhattan redevelopment project" means any project in lower Manhattan that is funded in whole or in part with federal or state funding, or any project intended to improve transportation between lower Manhattan and the two air terminals in the city of New York known as LaGuardia Airport and John F. Kennedy International Airport, or between lower Manhattan and the air terminal in Newark known as Newark Liberty International Airport, and that is funded in whole or in part with federal funding.

f. A public agency may participate in, sponsor, conduct or administer contracts for the purchase of goods or supplies necessary for a lower Manhattan redevelopment project by acting alone or in collaboration with one or more other public agencies or the port authority of New York and New Jersey. When a public agency acts in collaboration with another entity as authorized by this section, they shall

enter into a memorandum of understanding prior to soliciting bids or proposals, which shall identify which public agency's procurement policies are to be followed for the particular project.

g. A lower Manhattan redevelopment project shall not be subject to the provisions of this act where compliance with the provisions of this act would violate the terms or conditions of any applicable federal law or regulation.

h. If any clause, sentence, paragraph, section or part of this act shall be adjudged by any court of competent jurisdiction to be invalid, such judgment shall not affect, impair or invalidate the remainder thereof, but shall be confined in its operation to the clause, sentence, paragraph, section or part thereof directly involved in the controversy in which such judgment shall have been rendered. It is hereby declared to be the intent of the legislature that this act would have been enacted even if such invalid provisions had not been included herein.

SCHEDULE B

Casualty and Other Damage to the Work

In this Contract: (a) "Damage" or "Damaged" means any and all damage, destruction, or loss resulting from fire, weather, other casualty, vandalism, theft, and/or any other cause whatsoever; and (b) "Restoration" or "Restore" means and includes all repairs, additions, restorations, rebuilding, reconstruction, alterations, improvements, and replacements of every kind.

Until Final Completion (or whenever later performing Work on the Site), Contractor shall use care and diligence, and shall take precautions to protect the Work and other property of Owner and/or other Persons (including any materials, equipment, or other items furnished by Owner) from Damage. For such purpose, Contractor shall provide protective features (such as, for example, sidewalk bridges and other protective devices, tarpaulins, boards, boxing, frames, canvas guards, and fireproofing), security personnel, and other safeguards as required under the Contract Documents or otherwise as necessary and proper. Contractor shall bear the risk of Damage to the Work until Final Completion. In case of Damage to the Work prior to Final Completion, and regardless of the extent thereof or the estimated cost of Restoration, Contractor shall promptly undertake and complete Restoration of the Damaged Work for the same price as the portion of the Contract Price originally allocable to the Damaged Work, in accordance with the Contract Documents to the character and condition existing immediately prior to the Damage; and the CONTRACTOR'S SCHEDULE shall be revised to allow Contractor a reasonable time for such Restoration, taking into account the extent of the Damage, the complexity of Restoration, and the exigencies of the schedule for Contractor's Work as in effect before the Damage. If Contractor fails to undertake Restoration, or having commenced fails to complete Restoration in accordance with this Schedule "B" and the revised schedule for completion of Contractor's Work, Owner may (but shall not be obligated to) undertake and/or complete Restoration as a credit against the Lump Sum.

Contractor shall notify Owner and the insurers under any Builder's Risk Insurance and all other insurers who have issued insurance policies described in Schedule "G" of any Damage to the Work, or any accidents on the Project Site, as promptly as reasonably possible after Contractor learns of the same; and, within ten (10) days after learning of any occurrence, Contractor shall submit a full and complete written report to Owner and Architect. Contractor shall also submit to Owner and Architect copies of all accident and other reports filed with (or given to Contractor by) any insurance company, adjuster, or Governmental Authority.

All proceeds of the Builders' Risk Insurance (after deducting reasonable fees and costs incurred by Owner to collect the same) shall be paid to Owner, who shall have the exclusive right to adjust the same (and to negotiate, settle, and agree with the insurers as to all amounts payable by reason of the applicable Damage), and who shall hold such proceeds and apply the same towards payment of Contractor's requisitions for Restoration of the Damaged Work and next towards completion of the Work through Final Completion. To the extent the Damage is a covered loss under the Builder's Risk Insurance and was not caused by Contractor's faulty Work, error, negligence, or misconduct, Contractor's obligation to Restore Damaged Work shall be limited to the proceeds of Builder's Risk Insurance available to Owner under the foregoing sentence and any additional funds Owner elects, in Owner's sole discretion, to make available by Change Order; except, however, that regardless of the availability of insurance proceeds, Contractor assumes responsibility for minor theft, pilferage, and vandalism with respect to the Work.

SCHEDULE C

LMDC NON-DISCRIMINATION AND AFFIRMATIVE ACTION PROVISIONS

In this Schedule, "Contracting Party" means Contractor and any other parties included below in the definition of "Contracting Party".

I. Policy

It is the policy of the State of New York, Empire State Development Corporation ("ESDC"), LMDC and Owner to comply with all federal, State and local law, policy, orders, rules and regulations which prohibit unlawful discrimination because of race, ethnicity, creed, color, national origin, sex, sexual orientation, age, disability, marital status or status with regard to public assistance, and to take affirmative action to ensure that Minority and Women-owned Business Enterprises (M/WBEs), Minority Group Members and women share in the economic opportunities generated by LMDC's participation in projects or initiatives, and/or the use of LMDC funds.

(1) The Contracting Party represents that its equal employment opportunity policy statement incorporates, at a minimum, the policies and practices set forth below:

(a) Contracting Party shall (i) not discriminate against employees or applicants for employment because of race, ethnicity, creed, color, national origin, sex, sexual orientation, age, disability, marital status, or status with regard to public assistance, (ii) undertake or continue existing programs of affirmative action to insure that all employment practices are free from such discrimination and to insure that Minority Group Members and women are afforded equal employment opportunities without discrimination, and (iii) make and document its conscientious and active efforts to employ and utilize Minority Group Members and women in its workforce on Contracts. Such action shall be taken with reference to, but not limited to, recruitment, employment, job assignment, promotion, upgrading, demotion, transfer, layoff or termination, rates of pay or other forms of compensation, and selection for training or retraining, including apprenticeship and on-the-job training.

(b) At the request of Owner, the Contracting Party shall request each employment agency, labor union, or authorized representative of workers with whom it has a collective bargaining or other agreement or understanding, to furnish a written statement that such employment agency, labor union, or representative does not unlawfully discriminate, and that such union or representative will affirmatively cooperate in the implementation of the Contracting Party's obligations herein.

(2) Upon commencement of the contract services and quarterly thereafter during the term of the Contract, the Contracting Party shall submit to Owner, a Workforce Employment Utilization Report (Attachment C-1) of the workforce actually utilized on the Contract, itemized by ethnic background, gender, and Federal Occupational Categories or other appropriate categories specified by LMDC. In the case where the Contracting Party's and/or subcontractor's workforce does not change within the quarterly period, the Contracting Party shall so notify Owner in writing.

(3) The Contracting Party will send to each labor union or representative of workers with which it has a collective bargaining agreement or other contract or understanding, a notice advising the labor union or worker's representative of the Contracting Party's commitments hereunder, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

(4) The Contracting Party will, in all solicitations or advertisements for employees placed by or on behalf of the Contracting Party, state that it is an Equal Opportunity or Affirmative Action employer.

(5) The Contracting Party shall provide written or electronic notification to LMDC no later than five days prior to posting notification of procurement for goods, services, and or construction related activities contemplated by this Contract. This notification shall include type of procurement and information on how to obtain bid documents. The Contracting Party shall provide LMDC written or electronic notification no later than five days after award of contract for goods, services, or construction related activities contemplated by this Contract. This notification shall include name of the Contracting Party, contact name and phone number for the Contracting Party, type of services, and contract size. LMDC may publish notification of procurement and award of contract on LMDC's website and in regular mailings to small businesses, minority and women owned organizations, government agencies, and interested individuals. LMDC may facilitate meetings between contractors and the above groups for contracts awarded over \$1 million using HUD CDBG funds granted to LMDC. The Contracting Party shall be required to attend these meetings.

The Contracting Party shall include, or cause to be included, the provisions of Articles (1) through (5) above in every Contract or purchase order that it enters into in order to fulfill its obligations under this Contract, in such a manner that such provisions will be binding upon each and every Contracting Party with respect to any Contract or Subcontract.

II. Goals for Minority and Women-Owned Business Enterprise Participation

(a) The Contracting Party is required to use its best efforts to achieve an overall M/WBE participation goal of 20% of the total dollar value of this Contract.

(b) The goal for M/WBE participation in the performance of the work is expressed as a percentage of the contract price.

(c) The total dollar value of the work performed by M/WBEs will be determined as: (i) the dollar value of the work subcontracted to M/WBEs; (ii) where the Contracting Party is a joint venture, association, partnership or other similar entity including one or more M/WBEs -- the contract price multiplied by the percentage of the entity's profits/losses which are to accrue to the M/WBE(s) under the Contracting Party's agreement; or (iii) where the M/WBE is the Contracting Party -- the contract price.

(d) The Contracting Party shall include, or cause to be included, the provisions of Articles (a) through (c) in every Contract or purchase order that it enters into in order to fulfill its obligations under this Contract, in such a manner that such provisions will be binding upon each and every Contracting Party with respect to any Contract or Subcontract.

III. Reporting Requirements

The Contracting Party will permit access to its books, records and accounts, with respect to the Contract, by Owner and LMDC for purposes of investigation to ascertain compliance with the provisions herein. Upon request, the Contracting Party shall periodically file, or cause to be filed, reports, substantially in the format attached hereto as Attachments C-1 and C-2 (M/WBE Compliance Report to be filed monthly), with Owner, detailing compliance with the provisions of these non-discrimination and affirmative action Articles. An owner or officer of the Contracting Party shall certify to the accuracy of the information contained in the reporting documentation.

IV. Non-Compliance and Sanctions

In the event that any Contracting Party fails to use its best efforts to comply with the provisions herein, Owner may impose such sanctions on the Contracting Party by reason of the failure of the Contracting Party to use best efforts.

Such sanctions that may be imposed and remedies invoked hereunder, shall be considered independent of, or in addition to, sanctions and remedies otherwise provided by law.

ESDC AND LMDC NON-DISCRIMINATION AND AFFIRMATIVE ACTION DEFINITIONS

Affirmative Action

Shall mean the actions to be undertaken by any Contracting Party in connection with any project or initiative to ensure non-discrimination and Minority/Women-owned Business Enterprise and minority/female workforce participation, as set forth in Section II herein, and developed by ESDC or LMDC.

Affirmative Action Officer ("AAO")

Shall mean Owner's Project Manager-M/WBE Monitoring, or his/her designee, managing the affirmative action program for Owner..

Best Efforts - Minority and Women-owned Business Enterprise Participation

Best efforts are not limited to the efforts specified herein, and the role of M/WBE firms are not restricted to that of a subcontractor/subconsultant. Where applicable, M/WBE firms should be considered for roles as prime contractors. Such best efforts shall include at least the following:

- (a) Dividing the Work into smaller portions in such a manner as to permit subcontracting to the extent that it is economically and technically feasible to do so;
- (b) Actively and affirmatively soliciting bids from qualified M/WBEs, including circulation of solicitations to minority and women's trade associations. Each Contracting Party shall maintain records detailing the efforts made to provide for meaningful M/WBE participation in the work. Such record keeping must include the names and addresses of all M/WBEs contacted and, if a M/WBE is the low bidder and is not selected for such work or portion thereof, the reasons for such decision;
- (c) Making plans and specifications for prospective work available to M/WBEs in sufficient time for review;
- (d) Utilizing the services and cooperating with those organizations providing technical assistance to the Contracting Party in connection with potential M/WBE participation on the Contract;
- (e) Utilizing the resources of LMDC and ESDC's Affirmative Action Unit (AAU) to identify New York State certified M/WBE firms for the purpose of soliciting bids and subcontracts; and
- (f) Encouraging the formation of joint ventures, associations, partnerships, or other similar entities, where appropriate, to ensure that the Contracting Party will meet its obligations herein.

(g) The Contracting Party shall remit payment in a timely fashion.

Contract

Shall mean (i) a written agreement or purchase order instrument, or amendment thereto, executed by or on behalf of a Contracting Party, providing for a total expenditure in excess of \$5,000 for labor, services, supplies, equipment, materials or any combination of the foregoing funded in whole or in part with LMDC funds and (ii) any loan or grant agreement funded in whole or in part with LMDC funds.

Contracting Party

Shall mean (i) Contractor and any contractor, subcontractor, consultant, subconsultant or vendor supplying goods or services, pursuant to a contract or purchase order in excess of \$1,500, in connection with any projects or initiatives funded in whole or in part by ESDC and/or LMDC and (ii) any borrower or grantee receiving funds from ESDC or LMDC pursuant to a loan or grant document.

Minority Business Enterprise ("MBE")

Shall mean a business enterprise, including a sole proprietorship, partnership or corporation that is: (i) at least fifty-one percent (51%) owned by one or more Minority Group Members; (ii) an enterprise in which such minority ownership is real, substantial and continuing; (iii) an enterprise in which such minority ownership has and exercises the authority to control and operate, independently, the day-to-day business decisions of the enterprise; (iv) an enterprise authorized to do business in the State of New York and is independently owned and operated; and (v) an enterprise certified by New York State as a minority business.

Minority Group Member

Shall mean a United States citizen or permanent resident alien who is and can demonstrate membership in (A) one of the following racial groups: (i) American Indian or Alaska native, (ii) Asian, (iii) Black or African American, (iv) Native Hawaiian or Other Pacific Islander, OR (B) a Hispanic or Latino ethnic group.

Subcontract

Shall mean an agreement providing for a total expenditure in excess of \$1,500 between a Contracting Party and any individual or business enterprise, for goods or services rendered in connection with any project or initiative funded in whole or in part with ESDC funds or LMDC with funds from the U.S. Department of Housing and Urban Development.

Women-owned Business Enterprise ("WBE")

Shall mean a business enterprise, including a sole proprietorship, partnership or corporation that is: (i) at least fifty-one percent (51%) owned by one or more citizens or permanent resident aliens who are women; (ii) an enterprise in which the ownership interest of such women is real, substantial and continuing; (iii) an enterprise in which such women ownership has and exercises the authority to control and operate, independently, the day-to-day business decisions of the enterprise; (iv) an enterprise authorized to do business in the State of New York and is independently owned and operated; and (v) an enterprise certified by New York State as woman-owned.

Minority and Women Business Enterprise Listings

The ESDC Affirmative Action Unit (AAU) is available to assist you in identifying M/WBEs certified by the State of New York that can provide goods and services in connection with existing and proposed contracts. If you require M/WBE listings, please call the AAU at (212) 803-3224 or use ESDC's M/WBE database at <http://205.232.252.35/>

For additional assistance, contact LMDC's Project Manager-M/WBE Monitoring at (212) 962-2300.

Schedule C, Attachment C-1

Construction Contract

MONTHLY EMPLOYMENT UTILIZATION REPORT

(See next page for instructions)

COMPANY NAME: ADDRESS: TELEPHONE NUMBER: FEDERAL ID NO.: CHECK IF NOT-FOR-PROFIT:	PROJECT NAME: PROJECT LOCATION: COUNTY: _____ ZIP: _____ REPORTING PERIOD: Month _____ Year _____	CONTRACTOR START DATE: _____ ESTIMATED COMPLETION DATE: _____ PERCENT OF JOB COMPLETED (for reporting period): _____ CONTRACT NO.: _____ CONTRACT AMOUNT: ___\$	COMPANY EMPLOYMENT DATA																	
			A. TOTAL COMPANY EMPLOYEES (at the <i>Beginning of project</i>) Male Female	B. TOTAL COMPANY EMPLOYEES (at <i>the end of project</i>) Male Female	C. NET INCREASE <i>(applies only to changes, if any, in Company's Employee makeup at the end of project)</i> <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th colspan="2">TOTAL MALE</th> <th colspan="2">TOTAL FEMALE</th> </tr> <tr> <td>C1. EMPLOYEES</td> <td>C2. OCCUPATIONAL CODES/# OF EMPLOYEES</td> <td>C3. EMPLOYEES</td> <td>C4. OCCUPATIONAL CODES/# OF EMPLOYEES</td> </tr> </table>				TOTAL MALE		TOTAL FEMALE		C1. EMPLOYEES	C2. OCCUPATIONAL CODES/# OF EMPLOYEES	C3. EMPLOYEES	C4. OCCUPATIONAL CODES/# OF EMPLOYEES				
TOTAL MALE		TOTAL FEMALE																		
C1. EMPLOYEES	C2. OCCUPATIONAL CODES/# OF EMPLOYEES	C3. EMPLOYEES	C4. OCCUPATIONAL CODES/# OF EMPLOYEES																	
CLASSIFICATION	1. WORKER HOURS OF EMPLOYMENT										2. NUMBER OF WORKERS				3. CONSTRUCTION TRADES	TOTAL WHITE	TOTAL BLACK	TOTAL HISPANIC	TOTAL ASIAN	
	1a. ALL WORKER HOURS			1b. BLACK (Not of Hispanic Origin)		1c. HISPANIC		1d. ASIAN or PACIFIC ISLANDER		1e. NATIVE AMERICAN/ ALASKAN NATIVE		2a. ALL		2b. MINORITY						
	MALE	FEMALE	TOTAL	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE	MALE						FEMALE
Supervisory																				
Journey Worker																				
Apprentice																				
Trainee																				
Subtotal																				
Journey Worker																				
Apprentice																				
Trainee																				
Subtotal																				
Journey Worker																				
Apprentice																				
Trainee																				

Trees for WTC Memorial

COMPANY NAME:	PROJECT NAME:	CONTRACTOR START DATE: _____	COMPANY EMPLOYMENT DATA												
ADDRESS:	PROJECT LOCATION:	ESTIMATED COMPLETION DATE:	A. TOTAL COMPANY EMPLOYEES (at the Beginning of project)				B. TOTAL COMPANY EMPLOYEES (at the end of project)				C. NET INCREASE (applies only to changes, if any, in Company's Employee makeup at the end of project)				
TELEPHONE NUMBER:	COUNTY: _____ ZIP: _____	PERCENT OF JOB COMPLETED (for reporting period):	Male		Female		Male		Female		TOTAL MALE		TOTAL FEMALE		
FEDERAL ID NO.:	REPORTING PERIOD: Month _____ Year _____	CONTRACT NO.:	C1. EMPLOYEES	C2. OCCUPATIONAL CODES/# OF EMPLOYEES	C3. EMPLOYEES	C4. OCCUPATIONAL CODES/# OF EMPLOYEES	C1. EMPLOYEES	C2. OCCUPATIONAL CODES/# OF EMPLOYEES	C3. EMPLOYEES	C4. OCCUPATIONAL CODES/# OF EMPLOYEES	C1. EMPLOYEES	C2. OCCUPATIONAL CODES/# OF EMPLOYEES	C3. EMPLOYEES	C4. OCCUPATIONAL CODES/# OF EMPLOYEES	
CHECK IF NOT-FOR-PROFIT: _____	CONTRACT AMOUNT: \$ _____														
Subtotal															
TOTAL SUPERVISORS															
TOTAL JOURNEY WORKERS															
TOTAL APPRENTICES															
TOTAL TRAINEES															
GRAND TOTAL															

CERTIFICATION: I, _____ (Print Name), the _____ (Title), do certify that (i) I have read this Monthly Employment Utilization Report and (ii) to the best of my knowledge, information and belief the information contained herein is complete and accurate.

SIGNATURE _____ DATE _____

MONTHLY EMPLOYMENT UTILIZATION REPORT

Instructions for Completion

The Monthly Employment Utilization Report ("MEUR") is to be completed by each subject contractor (both Prime and Sub) and signed by a responsible official of the company. The reports are to be filed by the 5th day of each month during the term of the project, and they shall include the total work-hours for each employee classification in each trade in the covered area for the monthly reporting period. The prime contractor is responsible for submitting its subcontractors report, along with its own. Additional copies of this form may be obtained from Lower Manhattan Development Corp. ("LMDC").

Minority: Includes Blacks, Hispanics, Native Americans, Alaskan Natives, and Asian and Pacific Islanders, both men and women.

1. ***Worker Hours of Employment (a-e):***
 - a) ***All Worker Hours:*** The total number of male hours, the total number of female hours, and the total of both male and female hours worked under each classification.
 - b) through e) ***Minority Worker Hours*** The total number of male hours and the total number of female hours worked by each specified group of minority worker in each classification.
2. ***Number of Workers (a-b):***
 - a) ***All Workers*** Total number of males and total number of females working in each classification of each trade in the contractor's aggregate workforce during reporting period.
 - b) ***Minority Workers*** Total number of male minorities and total number of female minorities working in each classification, in each trade in the contractor's aggregate workforce during reporting period.
3. ***Construction Trade:*** Only those construction crafts which contractor employs in the covered area.
Construction Trades include: Field Office Staff (Professionals and Office/Clerical), Laborers, Equipment Operators, Surveyors, Truck Drivers, Iron Workers, Carpenters, Cement Masons, Painters, Electricians, Plumbers and Other.

Note: Owner may demand payroll records to substantiate work hours listed on the Monthly Employment Utilization Report, if discrepancies should arise.

OCCUPATIONAL CODES

Officials/Administrators	100
Professionals	110
Technicians	120
Sales Workers	130
Office & Clerical	140
Craft Workers	150
Operatives	160
Laborers	170
Service Workers	180

FORWARD TO:

*Beverly Bobb
Lower Manhattan Development Corp.
One Liberty Plaza, 20th Floor
New York, NY 10006
bbobb@RenewNYC.com
(212) 962-2300 Phone
(212) 962-2431 Fax*

SCHEDULE C, Attachment C-2

MBE/WBE COMPLIANCE REPORT

CONSTRUCTION

(to be filed monthly)

PROJECT SPONSOR/DEVELOPER: _____
 ADDRESS: _____

 TELEPHONE: _____
 CONTACT PERSON: _____

AA REPRESENTATIVE: _____
 PROJECT NAME: _____
 PROJECT START DATE: _____ PERCENT COMPLETE: _____
 ACTUAL COMPLETION: _____

Attach M/WBE contract documentation, i.e. executed contracts, signed purchase orders or canceled checks. This report should be completed by an officer of the reporting company, and forwarded to the Owner with the appropriate documentation.

PRIME CONTRACTOR (Name, Address, Contact Person and Phone)	TYPE OF CONTRACT (Trade/Service)	CONTRACT AMOUNT	SUB CONTRACTOR NO. & AMT.	MBE/WBE SUBCONTRACTOR (Name, Address, Contact Person and Phone)	SCOPE OF SERVICES	AMOUNT CONTRACTED TO MBE/WBE

CERTIFICATION: I, _____ (Print Name), the _____ (Title), do certify that (i) I have read this Compliance Report and (ii) to the best of my knowledge, information and belief the information contained herein is complete and accurate.
 SIGNATURE _____ DATE _____

Forward to:
 Beverly Bobb, Lower Manhattan Development Corp., One Liberty Plaza, 20th Floor, New York, NY 10006, bbobb@RenewNYC.com, (212) 962-2300 Phone, (212) 962-2431 Fax

SCHEDULE D

[omitted]

SCHEDULE E

[omitted]

SCHEDULE F OPPORTUNITY DOWNTOWN PLAN

The Lower Manhattan Development Corporation is committed to ensuring that minorities and women participate in the rebuilding of Lower Manhattan.

It is the policy of Owner and the Lower Manhattan Development Corporation (LMDC) to comply with all federal, State and local law, policy, orders, rules and regulations which prohibit unlawful discrimination because of race, ethnicity, creed, color, national origin, sex, sexual orientation, age, disability or marital status, and to take affirmative action to ensure that Minority and Women-owned Business Enterprises (M/WBEs), Minority Group Members and women share in the economic opportunities generated by LMDC's participation in projects or initiatives, and/or the use of LMDC funds. LMDC is a subsidiary of the Empire State Development Corporation (ESDC) and applies ESDC's non-discrimination and affirmative action policy to LMDC funded activities and contracts. The ESDC Affirmative Action Unit (AAU) is available to assist you in identifying M/WBEs certified by the State of New York that can provide goods and services in connection with existing and proposed contracts.

OPPORTUNITY DOWNTOWN PROGRAM HISTORY

In cooperation with Silverstein Properties, Tishman Construction, the Port Authority of New York and New Jersey, the Metropolitan Transportation Authority, the Manhattan Borough President's Office and the City and State of New York, the *Opportunity Downtown –Rebuilding Conference for Minority and Women Business Owners* was held on January 13, 2004 at Pace University to launch this initiative and provide information on contracting opportunities for minority- and women-owned businesses.

Building on the success of the first event, LMDC partnered with the Downtown Alliance, Manhattan Chamber of Commerce, the New York City Department of Small Business Services and the City and State of New York for the March 16, 2004 *Opportunity Downtown: Business to Business Exchange Event* – in an effort to identify and facilitate mutually beneficial procurement opportunities between Lower Manhattan's small businesses and corporations.

On March 31, 2004, LMDC, Non-Traditional Employment for Women, NOW Legal Defense and Education Fund, the Building Trade Employer's Association, and the General Contractor's Association sponsored *Opportunity Downtown: Women Working*. This free informational conference highlighted jobs in construction and the construction trades for women looking to change careers. The event included several hands-on demonstrations and a panel discussion with women who are in the industry. Additionally, an information session provided attendees information and access to pre- apprenticeship and training programs in the trades.

WTC Memorial

Owner intends to construct the Memorial and Memorial Museum at the World Trade Center (the Project). Contractor will be providing certain services for the Project, as elaborated in this Contract.

Owner and Contractor agree to coordinate their efforts to achieve the goals of Owner and LMDC in incorporating MBE & WBE concerns and to include minority and women employees into the project workforce. This Plan outlines the partnering efforts of Owner, LMDC and Contractor to achieve the goals of this Plan.

In accordance with this Plan, Contractor shall use best efforts to meet or exceed the following goals in satisfaction of the applicable opportunity-related provisions included within the Agreement:

- 20% participation of M/WBEs as certified by the State of New York.
- 25% participation of minorities in construction trades on the Project.
- 14% participation of women in construction trades on the Project.

This Plan outlines the terms and conditions of Contractor's obligation to use best efforts to achieve these goals, as well as Owner's commitment to use best efforts to assist Contractor in achieving these goals.

PART I: Minority and Women Owned Business Enterprises

Owner and Contractor agree to cooperate in the identification of qualified M/WBEs to be engaged in connection with the Project. The list of qualified M/WBEs will then be a resource to the first tier subcontractors of Contractor. Throughout the process of identifying and establishing a list of enterprises, Owner and Contractor shall coordinate their efforts. All communication with community groups and other outside organizations shall be through Owner or LMDC, unless specifically noted otherwise in this Plan.

1. M/WBE Programs.

Owner or LMDC shall arrange and host public M/WBE Programs, solely intended to inform the M/WBE community of the Project and the work and services to be performed in connection with the Project.

In connection with all such M/WBE Programs, Contractor shall:

- a.) Participate. Provide an overview of the Project identifying anticipated Project needs (such as contracting and purchasing needs). Such presentation shall include a description of the procurement methods and bidding requirements imposed by each subcontractor involved in the Project. (It is mutually acknowledged that such programs may occur after-hours or on non-work days.)
- b.) Provide an M/WBE questionnaire to be completed by each M/WBE seeking to be engaged in connection with the Project.
- c.) Be available for one-on-one discussions with individual M/WBEs seeking to be engaged in connection with the Project.
- d.) Provide literature to all conference attendees, which shall include the name, contact and other relevant information for Contractor and all other subcontractors engaged in the Project.
- e.) At LMDC's or Owner's request, consent to the inclusion on the LMDC or Owner website (or in LMDC- or Owner-prepared literature relating to the Project) of contact information and other relevant information for Contractor and its subcontractors.

2. General Outreach Program

Owner shall provide to Contractor (and Contractor shall provide to its first tier subcontractors), LMDC's current list of M/WBEs. Contractor shall require all first tier subcontractors to incorporate this information into their individual subcontractor/vendor lists and shall include these entities in their process of securing services.

During the course of the Project, it is expected that additional firms shall express an interest in performing services with respect to the Project. Owner and Contractor shall promptly notify the other of any such indications of interest received during the Project. Contractor shall require all subcontractors to notify them of any such indications of interest received during the Project. Contractor shall review such indications of interest and forward Information Questionnaires to each such M/WBE for completion. At Owner's or LMDC's request, Contractor shall consult with Owner or LMDC in such review.

Any M/WBEs added to the list through this subsequent qualification process shall be shared with the first tier subcontractors. The actual inclusion of any such M/WBEs into the Project shall be subject to the terms and conditions of this Plan.

In connection with these general outreach programs, Contractor shall:

- a.) Require the first tier subcontractors to provide an outline of the services required for their individual scopes of work and those services to be subcontracted.
- b.) Obtain from the first tier subcontractors the names of those M/WBEs which the subcontractors have previously used and those the subcontractors intend to use for the services listed.
- c.) Distribute an M/WBE questionnaire to those firms received from the subcontractors and create a consolidated list of firms for the subcontractors to contact for services and to invite to M/WBE programs described hereunder.
- d.) With the assistance of LMDC, consolidate any newly identified M/WBEs onto a master list of M/WBEs, which list shall be provided to all first tier subcontractors for use on the Project.

PART II: Minorities And Women in the Workforce

Owner and LMDC are committed to ensuring that women and minorities are afforded the opportunity to participate in the workforce. LMDC shall host conferences for recruiting minorities and women who currently serve in the trades or are eligible for apprenticeship programs to participate in the Project.

In consultation with, and with the reasonable assistance of Owner and/or LMDC, Contractor shall:

- 1) Interact with the local labor unions and organizations in meetings to identify and recruit minority and women to be well represented in the Project workforce.
- 2) Participate in any conferences held by LMDC to identify minorities and women in the unions or those who are eligible for apprenticeship programs who are interested in participating in the Project. Provide an overview of the Project and the membership procedures for the various unions to be engaged in the Project. (It is mutually acknowledged that such conferences may occur after-hours or on non-work days.)
- 3) Require at least one responsible party from each first tier subcontractor to participate in all such conferences and meetings.
- 4) Facilitate introductions between minority and women workers and key personnel from the subcontractors and unions involved in the Project.

- 5) As requested by Owner or LMDC, meet separately with minority and/or women's groups or labor forces to identify potential employment opportunities as they may occur.
- 6) As requested by Owner or LMDC, cooperate with Owner or LMDC in advertising and other public information activities aimed at informing minority and women workers as to the time and location of any conferences to be held and any other actions such workers may take to participate in the Project.

SCHEDULE G

CONTRACTOR INSURANCE REQUIREMENTS

This Schedule is in two parts. Part One sets forth the requirements applicable if Owner does not elect an Owner-Controlled Insurance Program ("OCIP"). Part Two sets forth the requirements if Owner elects to implement an OCIP.

Part One: Non-OCIP Requirements

The following requirements shall apply if Owner does not elect an OCIP:

1. The required insurance under this Contract means and includes, for Contractor, all coverages described in, and required under, below (the "Required Insurance" or the "Required Contractor Insurance").
2. Contractor shall secure and maintain the following insurance coverages, with the following minimum limits of coverage:
 - (a) Contractor will secure workers' compensation and disability insurance and keep insured during the life of this Contract such employees as are required to be insured by the provisions of Chapter 41 of the Laws of 1914, as amended, known as the Worker's Compensation Law;
 - (b) Contractor will secure commercial general liability insurance providing both bodily injury (including death) and property damage insurance in a limit not less than Two Million Dollars (\$2,000,000) aggregate and One Million Dollars (\$1,000,000) per occurrence. Such insurance is to be written on an occurrence basis. Owner shall be named as an additional insured.
 - (c) Automobile liability and property damage insurance in an amount not less than \$1,000,000.00 combined single limit for both bodily injury and property damage. Comprehensive automobile liability insurance for all owned, non-owned, leased, rented and/or hired vehicles insuring against liability for bodily and/or personal injury and death and for property damage in an amount of one million dollars (\$1,000,000), except that with respect to trucks involved in the Work, coverage shall be in an amount of four million dollars (\$4,000,000), which may be satisfied out of primary or umbrella coverage.
3. Except as specified for completed operations coverage under paragraph 2(b)(ii) above, Contractor shall maintain all coverage of Required Insurance from the date of this Contract through Final Completion and thereafter during any period while Contractor and/or any Subcontractor is performing any Work (including any warranty or corrective work) or furnishing any services pursuant to the Contract.
4. Contractor shall require that all Subcontractors carry workers' compensation insurance, general liability insurance, commercial automobile liability insurance, and property damage insurance on tools and equipment of the same categories as specified in paragraphs 2 and 3 and subject to the coverage amounts specified below; and Contractor shall require each subcontractor to furnish the same documentation of such coverage as required of Contractor hereunder, unless and except as Owner agrees otherwise in writing. The amount of insurance coverage to be maintained by each subcontractor shall be (i) for workers' compensation insurance, the amounts specified in

paragraph 2(a) above, (ii) for comprehensive automobile liability, the amounts specified in paragraph 2(c) above; and (iii) for commercial general liability insurance, at least two million dollars (\$2,000,000) or such other amount that Contractor believes reasonable for the type of Work being performed by the respective Subcontractor, subject to Owner's approval.

5. Contractor is advised that Owner does not maintain, nor intends to maintain, any insurance which would cover Contractor's or any Subcontractor's temporary plant and equipment used in connection with the Work. Accordingly, Contractor and each Subcontractor assumes all risk of damage or loss to such plant and equipment and releases Owner from any and all liability in connection with any damage or loss to any such plant and equipment.
6. Each insurance policy of Required Insurance (including policies for Subcontractors) shall contain the following (whether or not requiring additional premium):
 - (a) an agreement by the insurer that such policy shall not be cancelled, denied renewal (including cancellation or non-renewal for non-payment of premium), amended, or any coverage reduced, without at least thirty (30) days prior written notice by mail to Owner (with copies to Owner's Representative and Construction Manager) at the address specified in this Contract;
 - (b) an endorsement designating Owner and all other Indemnitees as additional insureds (except for the coverage required pursuant to paragraph 2(a));
 - (c) ISO endorsement CG 24 14 11 85 relating to the insurer's waiver of the right to assert governmental immunity; and
 - (d) a provision that a notice of accident or claim to the insurer by Owner shall be deemed notice by all insureds under the policy.

All insurance policies required to be maintained by Contractor shall be primary protection for losses due to Contractor's operations, and no Indemnitee shall be called upon to contribute to any loss.

7. Contractor and each Subcontractor shall deliver to Owner certificates of insurance evidencing the Required Insurance together with evidence of payment of premiums provided by the insurers, before bringing any personnel, materials, or equipment to the Project Site, or otherwise commencing the Work, whether on the Project Site, or elsewhere. Not later than five (5) days before any renewal premiums become due, Contractor shall deliver endorsements or other evidence of the renewal of all insurance. Contractor shall also deliver to Owner a true, correct, and complete copy of each policy of Required Insurance maintained by Contractor within fifteen (15) days after Owner's signing of the Trade Agreement, and at any time within five (5) days after written request from Owner, a true, correct, and complete copy of any the policies maintained by any Subcontractor as to whom Owner makes such request.
8. All the foregoing coverage shall be evidenced by valid and enforceable policies issued by a company or companies which are licensed to do business in the State of New York and having Best's Ratings of "A-" and "14" or better (or which are otherwise acceptable to Owner, such acceptance to be in writing). All liability insurance required to be provided and kept in force under this Schedule shall be written on the "occurrence" basis.

NOTE: Contractor is responsible at Contractor's expense, for securing any contractor pollution liability insurance (or similar coverage) which Contractor may deem necessary or

desirable to cover Contractor, its subcontractors, and their employees for all Work under this Contract and all activities, acts or omissions relating to the Project. Contractor agrees that neither Owner nor LMDC will include Contractor or its subcontractors on any contractor pollution liability insurance, pollution legal liability insurance or similar coverage; and Contractor and its subcontractors agree not to seek any such coverage or protection from Owner or LMDC.

Builder's Risk Insurance.

If LMDC is the Owner under this Contract, LMDC may elect, in its sole discretion, for Contractor to obtain a builder's risk insurance policy ("Builder's Risk Insurance"), in which case Contractor shall receive the amount set forth in the applicable add alternate line item in the Bid Form in Annex "7" as Contractor's sole compensation for the premium and cost of obtaining such policy. If LMDC is not the Owner under this Contract, and if Owner does not elect an OCIP, Owner shall be responsible for obtaining a builder's risk insurance policy. The terms and conditions required for a builder's risk insurance policy are described in Part Two, Section 5.a.(4), except that the minimum coverages for all policies other than real and personal property will be \$5,000,000.00 and the minimum coverage for real and personal property will remain the full completed value of hard costs.

Part Two: OCIP Requirements

The following requirements shall apply if Owner elects an OCIP:

A. Owner Controlled Insurance Program – General Provisions. Owner has elected to implement an Owner Controlled Insurance Program (hereinafter called OCIP) that will provide Workers' Compensation, Employer's Liability, General Liability and Excess Liability for Construction Manager (Bovis Lend Lease LMB, Inc.) and contractors of every tier providing direct labor for the construction of the property situated at the World Trade Center site, hereinafter called the "Project". All terms and conditions detailed below will apply during the term of the Contract. Owner agrees to pay all premiums associated with the OCIP including deductibles or self-insured retentions (giving the Construction Manager, Contractor and Subcontractors first dollar coverage) unless otherwise stated in the Contract Documents.

While the OCIP is intended to provide broad coverages and high limits, the OCIP is not intended to meet all the insurance needs of the Contractor. In addition to any insurance provided by Owner, Construction Manager, any enrolled Contractor and all Ineligible Contractors (as defined below) will be responsible for providing certain insurance as specified in section 8. We recommend that Contractors discuss the OCIP with their insurance agent or consultant to assure that other appropriate coverages are maintained by the broker/agent/consultant, to properly protect the Contractor and to conform with insurance required in this Schedule.

1. Applicability of the OCIP

Participation in the OCIP is mandatory but not automatic. Each Eligible Contractor (as defined below) must follow the program enrollment procedures outlined in the Insurance Manual.

"Eligible Contractor" includes Construction Manager and all Contractors and Subcontractors providing direct labor on the Project (see definition of Ineligible Contractors below). Temporary labor services and leasing companies are to be treated as an Eligible Contractor.

“Ineligible Contractor” includes (but is not limited to) consultants, suppliers (that do not perform or subcontract installation), vendors, material dealers, guard services, janitorial services, truckers (including trucking to the Project where delivery is the only scope of work performed).

Anyone considered ineligible that has direct labor on the Project will be required to maintain their own insurance and will be required to participate in the Project Safety Program. Coverage types and limits are shown in Section 8 are a minimum. Contractor will promptly furnish Owner, or its designated representative, with certificates of insurance giving evidence that all required insurance is in force, and in compliance, with Section 8.

The Project includes operations necessary or incidental to the Work. The Contractor’s regularly established workplace, plant, factory, office, shop, warehouse, yard or other property, even if such operations are for fabrications of materials to be used at the job site or training of apprentices, will be considered off-site and not subject to coverage under the OCIP.

2. Contractor Insurance Cost Identification

All Contractors/Subcontractors will provide bids of insurance and will separately identify their cost of each insurance coverage to be provided by Owner for their work at the Project on the Enrollment Form (Insurance Cost Identification Worksheet). A copy is attached and becomes an attachment to the Contract. The following procedures should be followed in determining Contractor’s insurance cost:

- a. Since first dollar coverage is provided under the OCIP for Construction Manager and all Contractors/Sub-contractors enrolled in the program, those Contractors that have deductibles or self insured retentions as respects their Workers Compensation and/or General Liability coverages, must present their insurance costs as follows:
 - (1) The amount of the Deductible or Self Insured Retention
 - (2) The cost of insurance premiums paid to insurers and to third party administrators
 - (3) The expected ultimate claims and expenses within the retention or deductible, for the current policy period, with backup documentation to support these calculations.
 - (4) The Contractor agrees to provide any reasonable documentation to support the insurance costs and ultimate claims and expenses.
- b. Contractors insurance cost calculations are based on the following coverage and limit requirements :
 - (1) Workers’ Compensation and Employer’s Liability Insurance: Workers’ Compensation insurance statutory benefits as provided by state statute; and employer’s liability limits:
 - (a) \$1,000,000 Bodily Injury with Accident - Each Accident;
 - (b) \$1,000,000 Bodily Injury by Disease - Policy Limit
 - (c) \$1,000,000 Bodily Injury by Disease - Each Employee
 - (2) Commercial General Liability Insurance:
 - (a) \$1,000,000 Bodily Injury/Property Damage each occurrence

- (b) \$2,000,000 Products/Completed Operations Aggregate
- (c) \$2,000,000 General Aggregate

Coverage shall include, but not be limited to, the following supplementary coverages:

- Contractual Liability to cover liability assumed under the agreement
- Product and Completed Operations Liability insurance
- Broad Form Property Damage Liability Insurance
- Explosion, collapse and underground hazards (should be no XCU exclusion) if such exposure exists
- Independent Contractors

Such policy shall include all of the coverages which may be included in coverages A, B and C contained in the standard Commercial General Liability Policy. Such policy must be issued upon an “occurrence” basis, as distinguished from a “claims made” basis.

Products and Completed Operations coverage is to be maintained for two (2) years after final payment.

- (3) Excess Insurance:
 - (a) The greater of \$4,000,000 or the current Umbrella limit, each occurrence and general aggregate
 - (b) The greater of \$4,000,000 or the current Umbrella limit for Products and Completed Operations – Aggregate

EXCEPTION:

Construction Manager shall base the cost of insurance on limit of \$100,000,000

- (c) Underlying coverage
 - (i) Excess of General Liability
 - (ii) Excess of Employers Liability
 - (iii) Excess of Completed Operations

All information furnished during this process will be considered confidential.

It is the Contractor’s responsibility to make sure all Subcontractors follow the same instructions.

3. Change Order Pricing

With respect to change orders for enrolled Contractors and Subcontractors that equal to or are greater than fifty thousand dollars (\$50,000), the costs should be submitted on a net basis (exclusive of insurance). The cost of insurance will be estimated as a percentage of the net cost for the change order, such percentage to be determined by the ratio of insurance costs reported in the initial bid (as noted in Section 2), to the total cost of that bid less insurance costs, e. g. if initial insurance costs were 3% of net bid (without insurance), it will be assumed that insurance costs in the change order would be 3% of the net cost of the change order.

4. Audit and Recovery of Contractor “Insurance Cost”

For insurance purposes, the Contractor and all tiers of Subcontractors agree, to keep and maintain accurate records of their payroll for operations at the **Project**. Contractor and all tiers of Subcontractors agree to forward the Monthly Payroll Reporting Form (Form-5) to the OCIP administrator. If not forwarded in a timely fashion, monthly payments to that Contractor will be withheld until payroll is reported as required.

The Contractor and all Subcontractors will permit Owner and its representative to examine and/or audit its relevant books and records. Contractor will also provide any additional relevant information to Owner or its appointed representatives as may be required.

At the end of each Trade Contract, an audit will be performed using the Contractor's reported payrolls and receipts furnished on the monthly payroll reports and/or insurer audits of payroll and/or receipts for the OCIP policies.

5. Owner Provided Coverages

The OCIP will be for the benefit of Owner, Construction Manager and Contractors/Sub-contractors of all tiers (unless specifically excluded) who have on-site employees. Such coverage applies only to work performed under the Contract at the Project site. Eligible Contractors/Sub-contractors must provide their own insurance for off-site activities and Automobile Liability in accordance with this schedule. Ineligible Contractors/Subcontractors, must provide their own insurance in accordance with this schedule.

Certificates of Insurance will be furnished for the Workers Compensation, General Liability, Builders Risk and Excess coverages by Owner or its representative. The Construction Manager and each enrolled Contractor shall receive their own Workers Compensation policy. These policies will be delivered to the Construction Manager and are available for review by Contractor/Subcontractor upon request to Owner. The terms of such policies or programs, as such policies or programs may be from time to time amended, are incorporated herein by reference. Contractor/Subcontractor hereby agrees to be bound by the terms of coverage as contained in such insurance policies and/or self-insurance programs.

Through a combination of insured and self-insured insurance programs Owner, at its sole expense, will provide and maintain in force the types of insurance listed in subsection (1) through (5) below as a part of the OCIP for the Construction Manager and Eligible Contractor/Subcontractors. The Contractor/Subcontractor enrolled in the OCIP agree that the insurance company policy limits of liability, coverage terms and conditions shall determine the scope of coverage provided by the OCIP.

a. Owner Provided Coverage

(1) Workers' Compensation and Employer's Liability Insurance will be provided in accordance with applicable state laws. Policies of insurance will be provided to the Construction Manager, Contractors and all tiers of Subcontractors reflecting the following Limits of Liability.

- (a) Workers' Compensation – Applicable State Statutory Benefits
- (b) Employer's Liability
 - (i) \$1,000,000 Bodily Injury each Accident
 - (ii) \$1,000,000 Bodily Injury by Disease – Policy Limit
 - (iii) \$1,000,000 Bodily Injury by Disease – Each Employee

(2) Commercial General Liability Insurance will be provided on an "occurrence" form under a master liability policy. Certificates of Insurance will be provided to the Construction Manager, Contractor/Subcontractor and all tiers of Subcontractors reflecting the following Limits of Liability, Coverages, and Terms:

- (a) \$2,000,000 Bodily Injury and Property Damage Liability Each Occurrence
- (b) \$4,000,000 General Aggregate Reinstated Annually

(c) \$4,000,000 Products and Completed Operations

Coverage shall include but not limited to the following supplementary coverages:
Occurrence Basis;
General Aggregate Per Location
Products;
Contractual Liability specifically designating the indemnity provision of this agreement as an insured contract;
Completed Operations/ Project (greater of Statute Of Repose, or five (5) years);
Independent Contractor/Subcontractor's Liability;
Personal Injury;
Explosion, Collapse, and Underground (should be no XCU exclusion)
Designated Premises Only.

- (3) Excess Liability Insurance will be provided under a master liability policy with the following Limits of Liability, Coverage and Terms as follows:
- (a) \$100,000,000 per occurrence
 - (b) \$100,000,000 aggregate

Coverage shall include but not limited to the following supplementary coverages:
Follow form of primary coverages noted below excess of:

- (a) General Liability
- (b) Employer's Liability
- (c) Completed Operations/ Project (greater of Statute Of Repose, or five (5) years);

- (4) Builders Risk Insurance provides "All Risk" coverage on a replacement cost basis. Policy will provide minimum coverage for:
- (a) Real & Personal Property: \$ full completed value of hard costs
 - (b) Soft Cost: \$ 11,000,000
 - (c) Flood (ann. aggregate) \$ 10,000,000
 - (d) Earthquake (ann. aggregate) \$ 10,000,000
 - (e) Expediting Expenses \$ 5,000,000
 - (f) Transit \$ 5,000,000
 - (g) Off Site Storage of Insured \$ 5,000,000

NOTE: Limits and sub-limits to be determined following an analysis of exposure to loss.

This insurance will include Owner, Construction Manager and all Contractors and all tiers of Subcontractors as insureds. The Builders Risk will not provide coverage against loss by theft or disappearance of any materials (unless the materials are intended to be incorporated into the Project), tools, equipment or other property of the Contractor or any tier of Subcontractor, or any other person furnishing labor or materials for the Project Site. Coverage will be afforded and, losses covered under the Builders Risk policy will be paid, to the Contractors and all tiers of Subcontractors to the extent of their respective insurable interest. The Contractor agrees to indemnify, defend and hold the Owner, Construction Manager and their respective officers, agents, and employees harmless from any such loss theft or disappearance.

The policy shall maintain a deductible of \$25,000 per occurrence, which is the responsibility of the Contractor or Sub-Contractor if damage is caused by their negligent act or omission. Otherwise, said deductible is the responsibility of the Owner.

Owner waives all rights of subrogation and recovery against the Construction Manager, Contractors and all Subcontractors of all tiers for damage to any of Owner's property or to the extent of any loss or damage, which is insured under the OCIP. Contractor waives all rights of subrogation and recovery against Owner, Construction Manager and other Contractors/Subcontractors of all tiers to the extent of any loss or damage, which is insured under the OCIP and Builders Risk. The Contractor and each Subcontractor will require all Subcontractors to similarly waive their rights of subrogation and recovery in each of their respective construction contracts with respect to their work on this Project site. The Builder's Risk policy will allow the insureds to waive the insurer's right of subrogation.

- (5) Railroad Protective Liability Insurance (ISO-CG 00 35 10 01 or equivalent form), covering the Project Work to be performed at the Project and affording protection for damages arising out of bodily injuries or death, injury to or destruction of property, including damage to the Insureds own property and conforming to the following:
 - (a) Metropolitan Transportation Authority ("MTA") as "Named Insureds", if required.
 - (b) Port Authority Transit Hub ("PATH") as "Named Insured", if required
 - (b) Limit of liability to conform to requirements of MTA and PATH

6. Certificates and Policies

Each Eligible Contractor and Construction Manager will receive a separate Workers' Compensation policy. The Construction Manager will receive copies of The General Liability, Excess Liability and Builders Risk policies. Certificates of Insurance will be furnished for the General Liability and Excess and Builder's Risk coverages These policies are available for review by the Contractor upon request to the Owner. The terms of such policies or programs, as such policies or programs may be from time to time amended, are incorporated by reference. Contractor agrees to be bound by the terms of coverage as contained in such insurance policies. .

All of Owner furnished insurance coverages (outlined in Section 5) shall be written by insurance companies authorized to do business in the State of the Project, with an AM Best Rating of A VIII or higher, and as approved by Owner.

7. Termination/Modification of the OCIP

Owner reserves the right to terminate or to modify the OCIP or any portion thereof. To exercise this right, Owner will provide thirty (30) days advance written notice of termination or material modification to the Construction Manager, Contractor and all Subcontractors covered by the OCIP. In such event, Construction Manager and those Eligible Contractors still working on the Project as of the termination date will promptly obtain appropriate replacement insurance coverage, pursuant to Article 8 of this schedule. Written evidence of such insurance will be provided to Owner prior to the effective date of the termination or modification of the OCIP coverages. The cost of such replacement insurance will be reimbursed by Owner to the Construction Manager and Eligible Contractors of their respective, then effective insurance program rates.

SPECIAL NOTE:

Any Contractor who has completed their Work at the Project and whose insurance as provided by Owner's OCIP has been terminated, who returns to the Project site to perform warranty work does so under its own insurance coverages and not under those coverages provided by Owner's OCIP.

8. Contractor Provided Coverage

The Eligible Contractors shall provide the following insurance, in the following situations for WTC Memorial – Trade Agreement General Conditions

- (i) Any Work under this Agreement, and until completion and final acceptance of the Work,
- (ii) Off Site Work, where noted below, and
- (iii) Any Work on the Site, after the OCIP has been terminated

The Contractor/Subcontractors, at their own expense, must provide this insurance promptly and furnish to Owner's Insurance Administrator and Construction Manager, Certificates of Insurance giving evidence that the following coverages are in force.

a. Contractor Provided Coverage

- (1) Automobile Liability Insurance 8.(i), (ii),(iii)]
 - (a) \$1,000,000 Combined Single Limit

Coverage shall include but not limited to the following supplementary coverages:

- All vehicles owned or leased
- All vehicles hired on behalf of the Contractor/ Subcontractor,
- All non-owned vehicles

- (2) Workers' Compensation and Employer's Liability Insurance (8.(ii),(iii) , and 8.(i) for Ineligible Contractors):
 - (a) Workers Compensation -New York Statutory Limits
 - (b) Employer's Liability Limits -
 - (i) \$1,000,000 Bodily Injury with Accident - Each Accident;
 - (ii) \$1,000,000 Bodily Injury by Disease - Policy Limit
 - (iii) \$1,000,000 Bodily Injury by Disease - Each Employee

This policy should be endorsed to exclude the Project if you are a participant in the OCIP, to the extent of Owner provided coverage

- (3) Commercial General Liability Insurance (8.(ii),(iii)) and 8.(i) for Ineligible Contractors)
 - (a) \$1,000,000 Bodily Injury and Property Damage per occurrence
 - (b) \$2,000,000 General Aggregate
 - (c) \$2,000,000 Products/Completed Operations Aggregate

Coverage shall include but not limited to the following supplementary coverages:

- Occurrence Basis;
- Premises operations;
- Contractual Liability;
- Products/Completed Operations;
- Broad Form Property Damage; and
- Independent Contractor/Subcontractors
- Form: "occurrence", as distinguished from "claims made".

This policy should be endorsed to exclude the Project if you are a participant in the OCIP, to the extent of Owner provided coverage

- (4) Excess Liability Insurance: 8.(ii),(iii) , and 8.(i) for Ineligible Contractors]
 - (a) \$4,000,000 each occurrence and general aggregate annually and
 - (b) \$4,000,000 Products and Completed Operations – Aggregate

- annually
- (c) **EXCEPTION:** Construction Manager \$100,000,000

Coverage shall include but not limited to the following supplementary coverages:
Follow form of primary coverages noted below excess of:

- (a) Automobile Liability
(b) Employer's Liability
(c) General Liability, including Completed Operations

This policy should be endorsed to exclude the Project if you are a participant in the OCIP, to the extent of Owner provided coverage

NOTE: If Contractor/Subcontractor participating in the OCIP chooses to have the policy endorsed to include the Project site during the construction period, coverage should be Excess and/or Difference in Conditions (DIC) of the OCIP This cost should not be passed back to Owner. Inclusion of the Project site on such insurance policies shall not replace the OCIP coverage or otherwise affect the cost identification requirement in Section 2.

“OWNER” , as Sponsor and Construction Manager (here in after called “INDEMNITEES”) and their respective directors, officers, representatives, agents and employees shall be identified on the certificate, and named as additional insureds on the Commercial General Liability, Automobile Liability and Excess Liability Policy:

9. Deductibles on Contractor Policies

If by the terms of this insurance any deductibles are required, or if the Contractor should elect, with the concurrence of Owner, to increase the deductible amounts or purchase this insurance with voluntary deductible amounts, the Contractor will be responsible for payment of the amount of all deductibles in the event of a paid claim.

10. Certificates of Insurance

Certificates of Insurance (including, but not limited to, for off-site activities, automobile liability and for OCIP) from Contractor (whether or not enrolled in the OCIP) reasonably acceptable to Owner will be filed with OCIP Administrator who will deliver certificates to Construction Manager within ten (10) days after award of the contract to Contractor and prior to commencement of the Work. All required insurance will be maintained without interruption from the date of commencement of the Work until the date of the final payment or expiration of any extended period as set forth in this Contract. These certificates and the insurance policies required by Section 2 will contain a provision that coverages afforded under the policies will not be materially modified or allowed to expire until at least thirty (30) days' prior written notice has been given to Owner and Construction Manager, with a copy to the OCIP Administrator. The provisions of this Section will apply to all policies of insurance required to be maintained by the Contractor pursuant to the Contract Documents.

11. Other Insurance

Any type of insurance or any increase of limits of liability not described in this section which the Contractor requires for their own protection or on account of any statute will be their own responsibility. Each such item must be shown as a line item and approved by Owner. Construction Manager will be reimbursed by Owner for charges specific to this Project associated with providing Professional Liability and Pollution Liability Insurance as a Cost of the Work.

12. Contractor Responsibilities

The Contractor will cooperate with and will require all Subcontractors to cooperate with Owner, Construction Manager and/or Owner's designated representative (hereinafter called the OCIP

WTC Memorial – Trade Agreement General Conditions

Administrator) with regards to the administration and operation of the OCIP. The Contractor/Subcontractor's responsibilities will include, but not be limited to:

- a. Compliance with all rules and regulations of the applicable State Insurance Bureau/Board;
- b. Compliance with applicable Construction Safety Program, Insurance Administration and Claims Procedures as outlined in the respective manuals;
- c. Provision of necessary contract, operations and insurance information;
- d. Cooperation with any insurance company or Insurance Administrator with respect to requests for claims, payroll or other information required under the program;
- e. Maintenance and reporting of monthly payroll and other records as necessary for premium computation;
- f. Immediate notification to Owner that any Contractor provided coverages have been cancelled, materially changed, or not been renewed.
- g. Completion of the administrative forms within the Insurance Manual.

Failure to follow the procedures outlined in the Construction Safety Program, Insurance Administration and Claims Procedures manuals may result in fines being assessed by the New York State Workers Compensation Bureau against the Contractor. Owner shall, at Owner's sole and reasonable discretion, deduct from monies due or to become due under the provisions of a Trade Contract for any applicable fines that are assessed against Owner, or any other insured party, as a result of Contractor's non-compliance with the provisions of this program.

13. Contractor's Responsibility for its Subcontractors.

The Contractor will include this document with the bid documentation and require that all Subcontractors of every tier participate in Owner OCIP and comply with all rules and procedures as outlined in the Insurance Manual. It will be the Contractor's responsibility to submit to Owner and its designated representative all bid documentation for approval.

14. Assignment of Return Premiums

Owner will be responsible for the payment of all premiums associated solely with the OCIP and will be the sole recipient of any dividend(s) and/or return premium(s) generated by the OCIP. In consideration of Owner's provision of said coverages under the OCIP program, the Contractor and Subcontractors agree to:

Identify all applicable insurance costs associated with their contract work; and cooperate with the OCIP Administrator in the confirmation of the insurance cost.

Irrevocably assign to and for the benefit of Owner, all return premiums, premium refunds, premium discounts, dividends, retentions, credits, and any other monies in connection with the OCIP insurance. Contractor agrees to evidence such assignment by executing and delivering the Enrollment Form. Contractor further agrees to require each Subcontractor to execute the assignment on the Enrollment Form for the benefit of Owner.

15. Waiver of Subrogation (Other Than Builder's Risk)

WTC Memorial – Trade Agreement General Conditions
NYC584406.10

Owner waives all rights of subrogation and recovery against the Construction Manager, Contractors and all Subcontractors of all tiers to the extent of any loss or damage, which is insured under the OCIP. Contractor waives all rights of subrogation and recovery against Owner, Construction Manager and other Contractors/Subcontractors of all tiers to the extent of any loss or damage which is insured under the OCIP. The Contractors and each Subcontractor will require all Subcontractors to similarly waive their rights of subrogation and recovery in each of their respective construction contracts with respect to their Work on the Project.

16. No Release

The provision of the OCIP by Owner will in no way be interpreted as relieving the Contractor or any Subcontractor of any other responsibility or liability under the Trade Contract or any applicable law, statute, regulation or order.

17. Approval of Forms and Companies

All insurance described in this Section will be written by an insurance company or companies reasonably satisfactory to Owner and authorized (licensed) to do business in the State of the Project and will be in a form and content reasonably satisfactory to Owner. No party subject to the provisions of this contract will violate or knowingly permit to be violated any of the provisions of the policies of insurance described herein.

18. Coverage to be provided by Contractor for Work it performs during Warranty Period

Should Contractor be required to return to the Project site to perform Work during the warranty period under the Trade Contract, Contractor will maintain in full force and effect all insurance described in Article 8 of this schedule (on-site requirements) covering all Work performed during such period.

19. Claims Responsibilities

The Construction Manager and all Contractors/Subcontractors shall adhere to and perform all reporting requirements as set forth in the Claims Procedures portion of the OCIP Program Manual.

20. General provisions -

a. Safety Requirements

(1). Owner is committed to providing construction workers with the safest possible environment while working on their property. It is Owner's intention that its project will be safe to the workers and the public. The Contractor shall take all necessary precautions to protect the safety and health of its employees; Subcontractors, and their agents and employees; and other persons or entities performing portions of the work for or on the behalf of the Contractor or any of its Subcontractors on the Project site. The Contractor shall establish a Project Safety Program, which, at a minimum, shall meet the requirements set forth below. The Contractor shall comply with, and ensure compliance with, the Project Safety Program by its employees, Subcontractors, their agents and employees and other persons or entities performing portions of the work for or on the behalf of the Contractor or any of its Subcontractors on the Project site.

(2). The Contractor will comply, and shall require that all Subcontractors comply, with all applicable Occupational Safety & Health Act (OSHA) regulations and all other current and applicable federal, state, county and municipal safety, health, and environmental laws and regulations.

(3). Owner will designate a Project Safety Manager to act as a representative of Owner, with authority to monitor the Contractor's Project Safety Program. The Project Safety Manager

will have full authority to issue safety violations to Contractors and stop work orders when it is necessary to enforce mandatory safety requirements involving imminent danger violations.

- (4). The Contractor shall notify Owner/Project Safety Manager and Construction Manager immediately by telephone, followed by written confirmation within 24 hours, of any product, material, or condition which creates an imminent danger situation or fails to comply with applicable safety laws.
- (5). All workers will complete a safety orientation instituted by the Construction Manager before a worker can enter the work area. In addition to addressing each company's own safety needs and procedures the orientation must incorporate the provisions stated herein. In the case of conflict between the Contractor's own safety regulations and the provisions stated herein, the most stringent rules and regulations shall apply.
- (6). The Contractor and all Subcontractors shall attend Toolbox Safety Meetings for their employees on a weekly basis.. If the Contractor or any Subcontractor has more than one accident (involving injury) within five working days, Toolbox Safety Meetings for worker involved and Contractor's foremen and superintendent will all be required daily for the next five working days. The Construction Manager will reasonably attend Toolbox Safety Meetings and will collect minutes of all meetings and will review same. In addition foreman and superintendent of each Contractor shall attend weekly safety meetings to address supervision of safety issues
- (7). Owner requires the Contractor and all Subcontractors to maintain written records in a Safety Management Log Book available for review by Owner/Project Safety Manager and Construction Manager at the Project site and be responsible for monitoring the following items:
 - (a) Written Safety Programs which must include fall protection plans, hazard communication, PPE, drug & alcohol policy, inspection, and disciplinary policy;
 - (b) OSHA 300 log of occupational injuries and illnesses for all Contractors and Subcontractors that occur on the Project site;
 - (c) Documentation of subject, date, time, trainer and attendance for Toolbox Safety Meetings;
 - (d) Documentation of accident/near misses investigations resulting from any on-site incident;
 - (e) Documentation of required site safety audits and daily self-inspections;
 - (f) An inventory list of the properly labeled and stored containers and the corresponding Material Safety Data Sheets (MSDS) for all hazardous or flammable chemicals as defined by OSHA compliance standards that are used on the Project site in the performance of the work;
 - (g) Names and contact numbers of each Contractor's and Subcontractor's safety representatives and competent persons.
- (8). Each Contractor shall employ a full-time dedicated Safety Manager to be on site during all phases of its operation. The sole responsibility of this Safety Manager shall be the management of all safety matters as specified in the Contractor's safety program and the Project Safety Program. Any Subcontractor employing 50 or more employees will be required to employ a dedicated full time safety officer. All Subcontractors shall have designated safety representatives that shall have full authority necessary to correct unsafe

or hazardous conditions. The safety representatives are not required to be full-time safety representatives and may have other duties; however, the safety representatives must be allowed adequate time to conduct all necessary safety activities required for a successful operation of the safety program. Selections of these representatives are subject to approval of Owner/Project Safety Manager and Construction Manager.

- (9). The Contractor shall be held responsible for its Subcontractors' compliance with the requirements of the Project Safety Program. The Owner and Construction Manager are not responsible and assume no responsibility for compliance by the Contractor or any Subcontractor or workers on the Project site.
- (a) If the Project Safety Manager or Construction Manager notifies the Contractor of any non-compliance with the provisions of this program, the Contractor shall make all reasonable efforts to correct the unsafe conditions or acts. Satisfactory corrective action shall be taken within the timeframe specified by Owner or Construction Manager. If a Contractor or Subcontractor refuses to correct unsafe or unhealthy conditions or acts, Owner may take one or more of the following steps:
 - (b) Cease the operation or a portion thereof until the condition is brought into compliance with the Safety Program;
 - (c) Stop payment to Contractor for the work being performed;
 - (d) Correct the situation using other employees and back charge the Contractor for expenses incurred;
 - (e) Remove the Contractor's supervisor responsible from the Project.

All costs, including but not limited to those above, associated with insuring a safe and health conscious work environment shall be borne by the non-complying Contractor and costs will be charged to the non-conforming Contractors.

- (10). The Contractor's Project Managers, Superintendents, Foremen and designated safety representatives who work on the Project shall have completed the OSHA 10 hour Construction Course within two years of working on the Project site. If the Contractor's Project Manager, Superintendents, Foremen and designated safety representatives work on the site for over 1 year they shall have completed the OSHA 30 Hour Construction Course. Other specific training in such areas as, Scaffolding, Fall Protection, Excavation, First-aid/CPR Certification, Fire Protection, Confined Space, etc. are required if those areas are in the scope of the work to be performed.
- (11). Contractor shall immediately correct any imminent danger situations brought to his attention. Other unsafe conditions, unsafe work, construction equipment, tools, or any other unsafe act or conditions will be corrected within 24 hours after receiving notice from Owner/Project Safety Manager or Construction Manager. The Contractor shall correct the unsafe condition before proceeding with the work. Lost time, lost productivity and fines associated with this or any safety violation will be at the sole cost of the Contractor without additional cost to Owner or Construction Manager.
- (12). The Contractor shall provide a complete and comprehensive protection plan against worker falls from elevations of six feet or more including steel erection, decking, scaffolds, roofing, articulating booms (JLG type), scissor lifts, elevated work platforms, etc., except when working on ladders less than 10 feet.

(13). Contractors and Sub-Contractors are required to have a Drug Free Workplace Policy.

b. Submittals

- (1) The Contractor shall submit to Construction Manager its written Project Safety Program thirty (30) days prior to commencing any Work. Each item in the Safety Program shall be explained in a comprehensive fashion. Details will include, but not limited to:
 - (a) a plan for conveying the information contained in the Project Safety Program and Contractor's Safety Program to the Contractor's and Subcontractor's workers on the Project,
 - (b) a plan for implementing the Project Safety Program and Contractor's Safety Program at the site,
 - (c) monitoring and compliance procedures,
 - (d) OSHA record keeping and man-hours worked reporting to the Construction Manager,
 - (e) work-related incidents reporting and investigating procedures,
 - (f) first aid and medical management procedures,
 - (g) emergency response plan,
 - (h) program management, safety enforcement, and corrective action procedures,
 - (i) a Project specific fall protection plan promoting 100% 6 feet fall protection, and
 - (j) a Drug Free Workplace Policy.
- (2) Contractor shall submit to Owner/Program Safety Manager and Construction Manager a resume documenting qualifications of its proposed Safety Manager thirty (30) days prior to commencing any Work. The resume must show a minimum of five years experience as a heavy construction Safety Supervisor including a description of the duties, responsibilities and accomplishments.
- (3) The Contractor shall submit for each worker that attends the Safety Orientation, the worker's name, social security number, date of the Safety Orientation to the Construction Manager. This information shall be submitted within (5) five days of the completed Safety Orientation.
- (4) All proposed designated break areas and smoking areas must be submitted to Owner/ Project Safety Manager and Construction Manager for approval.
- (5) The Project Safety Manager, Construction Manager and/or designees, will monitor the disciplinary actions of the Contractor and all disciplinary actions will be documented and submitted in writing by the Project Safety Manager to Owner.
- (6) The Contractor shall submit to the Project Safety Manager and Construction Manager, within (24) hours of any violation, a written response documenting all corrective actions taken, including disciplinary actions.
- (7) Any Supervisor receiving (3) three written warnings associated with workers under their supervision will be dismissed from the Project and will not be permitted to return without prior approval from Owner/ Project Safety Manager.
- (8) Any worker dismissed from the Project site due to safety violations will not be permitted to return to work without prior approval from Owner/ Project Safety Manager.

Owner reserves the right to hold back payments to Contractors if the above requirements are not met until such time as requirements are complied with by Contractor.

CHANGES TO ANY OCIP REQUIREMENT OR PROCEDURE MUST BE APPROVED BY OWNER AND OCIP ADMINISTRATOR. NO CONTRACTOR OR SUBCONTRACTOR HAS THE AUTHORITY TO AMEND THE OCIP REQUIREMENTS.

EXHIBIT 1
PERFORMANCE AND PAYMENT BONDS

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS that we, the undersigned Contractor, a corporation organized under the laws of the State of _____, and surety company, as principal and surety, respectively,

Contractor _____ Surety _____

are hereby held and firmly bound unto _____ (hereinafter called "Owner") and its heirs, executors, administrators and successors in the penal sum of _____ Dollars and zero Cents (\$ _____), for the payment of which sum of money, well and truly to be made, we and each of us hereby jointly and severally bind ourselves, our heirs, representatives, executors, administrators, successors and assigns.

Signed this _____ day of _____ 2005

The condition of the above obligation is that:

WHEREAS, the above named principal (referred to herein as "principal" and/or "Contractor") has entered into a contract with Owner dated as of _____, 2006, a copy of which contract is by reference made a part hereof and is hereinafter referred to as the "Trade Contract," and

WHEREAS, Owner has required this bond for the faithful performance of the Work (as defined in the Trade Contract) to be performed under the Trade Contract;

NOW THEREFORE, if the said principal shall promptly, well and faithfully do and perform the Work agreed by such principal to be done and performed according to the terms and true intent and meaning of the Trade Contract, then this obligation shall be void, otherwise to remain in full force and effect. It is expressly understood and agreed that the aggregate liability of the surety for any and all claims hereunder shall in no event exceed the penal amount of this obligation as hereinbefore stated.

In the event that Owner terminates the Trade Contract as a result of Contractor's breach of the Trade Contract, the surety shall:

(a) complete all Work in accordance with the terms, covenants, conditions and provisions of the Trade Contract, or

(b) obtain a bid or bids for completing the Work from bidders satisfactory to Owner and, upon a determination by Owner and the sureties of the lowest responsible bid, arrange a contract between Owner and such bidder upon terms and conditions satisfactory to Owner (hereinafter referred to as a "Completion Contract"); and the surety shall make available as work progresses under a Completion Contract sufficient funds to pay the cost of completion of the Work thereunder, less the Balance of the Contract Price; but not exceeding, including all other loss and expense for which the sureties may be liable under this bond, the penal sum. The term "Balance of the Contract Price" shall mean the Lump Sum under the Trade Contract less all amounts previously paid to Contractor.

The term "Work" as used herein shall have the same meaning as in the Trade Contract.

Surety shall be bound by decisions of the Interim Arbitrator to the same extent as Contractor. Surety agrees that submission of any matter to the Interim Arbitrator, and/or any decision or other action of the Interim Arbitrator, shall not discharge, release, amend, or waive this Performance Bond or any rights of Owner thereunder.

Any suit by Owner under this bond must be instituted before the earlier of: (a) the expiration of two (2) years from the date of substantial completion of the Work, or (b) two (2) years after the principal ceased performing the Work under the Trade Contract. If the limitation set forth in this bond is void or prohibited by law, the minimum period of limitation available to the surety as a defense in the jurisdiction of the suit shall be applicable, and said period of limitation shall be deemed to have accrued and shall commence to run no later than (y) the date of substantial completion of the Work or (z) the date the principal ceased performing Work, whichever occurs first.

The surety, for value received, hereby stipulates and agrees that its obligations under this bond shall be in no way impaired or affected by any extensions of time, modification, omission, addition or change in or to the Trade Contract, or by any supervision or inspection or omission to supervise or inspect the Demolition; and said surety does hereby waive notice of any and all of such extensions, modifications, omissions, additions, changes, or waivers.

The amount of this bond shall be reduced by and to the extent of any payment or payments made by surety in good faith hereunder whether made directly to Owner or otherwise in discharge of principal's obligations. **No demand made under this bond shall constitute a waiver of the right of Owner to make a subsequent demand under this bond, provided, however that** the surety's liability hereunder to Owner is limited, singly, or in the aggregate, to the penal sum of the bond set forth herein. This bond shall not afford coverage for any liability of the principal for tortious acts, whether or not said liability is direct or is imposed by the Trade Contract, and shall not serve as or be a substitute for or supplemental to any liability or other insurance required by the Trade Contract.

This bond shall be governed by, and construed in accordance with, the laws of the State of New York, without giving effect to conflict of law principles.

[SIGNATURE PAGE FOLLOWS THIS PAGE]

IN WITNESS WHEREOF, the principal and the sureties have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, the day and year first set forth above.

Principal: _____

By: _____

Name:

Title:

(Seal)

Surety: _____

By: _____

Name:

Title:

APPROVED AS TO ACCEPTABILITY OF SURETY:

LOWER MANHATTAN DEVELOPMENT CORPORATION

By: _____

Name:

Title:

ACKNOWLEDGMENT OF PRINCIPAL

State of _____

SS:

County of _____

On this _____ day of _____, 20____, before me personally came and appeared _____ to me known, who being by me duly sworn, did depose and say that he resides at _____; that he is the _____ of _____ the corporation described in and which executed the foregoing instrument; that he knows the seal of said corporation; that one of the seals affixed to said instrument is such seal; that it was so affixed by order of the directors of said corporation, and that he signed his name thereto by like order.

(Seal)

AFFIX ACKNOWLEDGMENT AND JUSTIFICATION OF SURETY

PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS that we, the undersigned Contractor, a corporation organized under the laws of the State of _____, and surety company, as principal and surety, respectively,

Contractor _____ Surety _____

are hereby held and firmly bound unto _____ (herein called "Owner") and its heirs, executors, administrators and successors in the penal sum of _____ Dollars and zero Cents (\$ _____), for the payment of which sum of money, well and truly to be made, we and each of us hereby jointly and severally bind ourselves, our heirs, representatives, executors, administrators, successors and assigns.

Signed this _____ day of _____ 2005

The condition of the above obligation is that:

WHEREAS, the above named principal (referred to herein as "principal" and/or "Contractor") has entered into a contract with Owner dated as of _____, 2006, a copy of which contract is by reference made a part hereof and is hereinafter referred to as the "Trade Contract," and

WHEREAS, Owner has required this bond for the prompt payment of all lawful claims of Claimants arising out of the performance of the Trade Contract;

NOW THEREFORE, if the said principal shall promptly, well and faithfully pay all amounts due from principal according to the terms and true intent and meaning of the Trade Contract, and if all lawful claims of Claimants arising out of the performance of the Work under the Trade Contract are paid, then this obligation shall be void, otherwise to remain in full force and effect. It is expressly understood and agreed that the aggregate liability of the surety for any and all claims hereunder shall in no event exceed the penal amount of this obligation as hereinbefore stated.

Every Claimant who has not been paid all monies due to such Claimant for Labor or Materials furnished by such Claimant may sue on this bond for the use of such Claimant, prosecute the suit to final judgment for such sum or sums as may be justly due Claimant, and have execution thereon. Owner shall not be liable for the payment of any costs or expenses of any such suit. A "Claimant" is any person who has furnished Labor or Material to the Contractor or to a subcontractor of the Contractor in the prosecution of the Work. "Labor" shall include all wages and compensation for labor performed. "Materials" shall include all materials and supplies (whether or not incorporated in the Work), as well as machinery and equipment rented or purchased for the Work. Labor and Materials shall include, also, water, gas, power, light, heat, oil, gasoline, telephone, and other utilities. "Work" shall have the same meaning as in the Trade Contract.

The above-named principal and surety hereby jointly and severally agree with Owner that every Claimant as herein defined who has not been paid in full before the expiration of a period of ninety (90) days after the date on which the last of such Claimant's work or labor was done or performed or materials were furnished by such Claimant, may bring suit on this bond, prosecute the suit to final judgment for the

amount due under Claimant's contract for the labor and/or materials supplied by the Claimant which were used, consumed or incorporated in the performance of the Work, and have execution thereon; provided, however, that a Claimant having a direct contractual relationship with a subcontractor of the principal shall have a right of action on this bond only if said Claimant notifies the surety in writing of its claim within ninety (90) days from the date on which said Claimant did or performed the last labor and/or materials for which the claim is made. Owner shall not be liable for the payment of any costs or expenses of any such suit.

Surety shall be bound by decisions of the Interim Arbitrator to the same extent as Contractor. Surety agrees that submission of any matter to the Interim Arbitrator, and/or any decision or other action of the Interim Arbitrator, shall not discharge, release, amend, or waive this Payment Bond or any rights of Owner thereunder.

No suit or action shall be commenced hereunder by any Claimant (a) after the expiration of the earlier of: (1) one year after the day on which the Claimant last supplied the labor and/or materials for which the claim is made; or (b) the limitation period set forth in the public works bond statutes, if any, in the location where the Work is being performed. Any limitation contained in this bond which is prohibited by any law controlling in the state where the suit is filed shall be deemed to be amended so as to be equal to the minimum period of limitation permitted by the law of that state; and other than in a state court of competent jurisdiction in the county or other political subdivision of the state in which the project, or any part thereof, is situated, or in the United States District Court for the district in which the project, or any part thereof, is situated, and not elsewhere.

This undertaking is for the benefit of all Claimants having lawful claims arising out of the performance of said Contract, and all such Claimants shall have a direct right of action upon this bond.

The surety shall give the General Counsel of Owner written notice of surety's payment of any claim of a Claimant hereunder, within ten (10) days of the date of such payment, at the following address: General Counsel, Lower Manhattan Development Corporation, One Liberty Plaza, New York, NY 10006.

The surety, for value received, hereby stipulates and agrees that its obligations under this bond shall be in no way impaired or affected by any extensions of time, modification, omission, addition or change in or to the Trade Contract, or by any supervision or inspection or omission to supervise or inspect the Demolition, or by any payment thereunder before the time required therein; and said surety does hereby waive notice of any and all of such extensions, modifications, omissions, additions, changes, payments, or waivers.

The amount of this bond shall be reduced by and to the extent of any payment or payments made by surety in good faith hereunder to any Claimant(s). The surety's liability hereunder to all Claimants is limited, singly, or in the aggregate, to the penal sum of the bond set forth herein. This bond shall not afford coverage for any liability of the principal for tortious acts, whether or not said liability is direct or is imposed by the Trade Contract, and shall not serve as or be a substitute for or supplemental to any liability or other insurance required by the Trade Contract.

This bond shall be governed by, and construed in accordance with, the laws of the State of New York, without giving effect to conflict of law principles.

[SIGNATURE PAGE FOLLOWS THIS PAGE]

IN WITNESS WHEREOF, the principal and the sureties have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, the day and year first set forth above.

Principal: _____

By: _____

Name:

Title:

(Seal)

Surety: _____

By: _____

Name:

Title:

APPROVED AS TO ACCEPTABILITY OF SURETY:

LOWER MANHATTAN DEVELOPMENT CORPORATION

By: _____

Name:

Title:

ACKNOWLEDGMENT OF PRINCIPAL

State of _____

County of _____ SS:

On this _____ day of _____, 20____, before me personally came and appeared _____, to me known, who being by me duly sworn, did depose and say that he resides at _____; that he is the _____ of _____ the corporation described in and which executed the foregoing instrument; that he knows the seal of said corporation; that one of the seals affixed to said instrument is such seal; that it was so affixed by order of the directors of said corporation, and that he signed his name thereto by like order.

(Seal) _____.

AFFIX ACKNOWLEDGMENT AND JUSTIFICATION OF SURETY

AFFIDAVIT AND WAIVERS OF LIEN

**CONTRACTOR'S
AFFIDAVIT**

STATE OF _____)
) ss.:
 COUNTY OF _____)

_____, being duly sworn, deposes and says:

1. That he [she] is the _____ of _____ ("Contractor"), which has entered into a Trade Agreement dated as of _____, 2006 (the "Contract") with Lower Manhattan Development Corporation, a subsidiary of Empire State Development Corporation with offices at One Liberty Plaza, New York, New York 10006 ("Owner"), covering the Work for the Project for the Memorial and the Memorial Museum. Words and phrases defined in the Contract have the same meanings in this Affidavit.
2. That this Affidavit is made for the purpose of inducing Owner to make payment under Requisition No. ____ dated _____, 200__ (the "Requisition"), in accordance with the terms of the Contract, and that Owner will rely on the truth of the statements contained herein in making such payment.
3. That Contractor has paid in full and without any improper or illegal deductions or rebates), but less agreed retainages, in accordance with the Contract, for all Work (including labor, materials and services, and all social security, unemployment insurance, sales, and other taxes applicable thereto) supplied, furnished or performed through the date of Contractor's previous Requisition.
4. That as of the date hereof no claims have been made against Contractor for any unpaid Work, with the exception of the following, and as to such unpaid claims (except with respect to Work not in compliance with the Contract) Owner is hereby authorized, at Owner's option, and on Contractor's behalf, to make direct payment to such claimants and charge the amounts of such payments to Contractor as follows:

NAME AND ADDRESS	ITEM	AMOUNT

5. That no payment made to Contractor shall be deemed Owner's acceptance of defective Work or shall operate as an admission on the part of Owner or Owner's Representative that Contractor has complied with the Contract or any part thereof.
6. That annexed hereto as Schedule "A" is a list of all Subcontractors who, prior to the date of this Affidavit, have supplied, furnished or performed Work (or portions thereof).

7. That all sums received by Contractor shall be held in trust to pay for the Work before being used for any other purpose.

By: _____
Name:
Title:

Subscribed and sworn to before me
this ____ day of _____, 200__

Notary Public

SCHEDULE A

The following Subcontractors have, as of the date hereof, performed Work under the Contract and the status of payments under their Subcontracts is as set forth below:

<u>SUBCONTRACTOR</u>	<u>TRADE</u>	<u>ADJ. CONTRACT PRICE</u>	<u>AMOUNT PAID TO DATE</u>	<u>AMOUNT OF MOST RECENT PAYMENT</u>	<u>CHECK NUMBER OF MOST RECENT PAYMENT</u>
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CONTRACTOR'S PARTIAL RELEASE AND WAIVER OF LIEN

_____ ("Contractor"), in connection with the performance of a project of LOWER MANHATTAN DEVELOPMENT CORPORATION with offices at One Liberty Plaza, 20th Floor, New York, New York 10006 ("Owner"), commonly known as the World Trade Center Memorial Trees for the World Trade Center Memorial, Memorial Museum and related facilities ("Project"), has requisitioned certain sums pursuant to its Application for Payment No. _____ dated _____, _____ (the "Requisition") for Work supplied, furnished or performed for the Project to the date of the Requisition in accordance with Contractor's agreement with Owner (the "Contract"). Upon receipt of payment in the amount of \$ _____, which amount Contractor, for Owner's benefit, DOES HEREBY CERTIFY AND ACKNOWLEDGE constitutes all sums due and owing to Contractor in accordance with the Contract with respect to the Requisition (other than sums withheld by Owner), for Work supplied, furnished or performed for the Project to the date of the Requisition, Contractor, for Owner's benefit, DOES HEREBY FOREVER RELEASE AND WAIVE for Contractor, its successors and assigns any and all rights, claims and demands Contractor has or may have against Owner, LMDC or the Port Authority of New York and New Jersey (the "Port Authority") (including any rights which Contractor has or may have pursuant to the New York Lien Law to file any lien or notice of lien against the Project or any property of Owner, LMDC or the Port Authority on account of or deriving from Work performed or furnished for the Project to the Requisition date) other than (1) claims for any portion of the amount certified above which Owner does not pay and which the parties dispute, (2) unpaid amounts of prior requisitions which were properly prepared and submitted and which Owner does not dispute, and (3) claims for disputed work for which Contractor has given proper notice pursuant to the Contract or for which the time to give notice under the Contract has not yet expired. As used herein, "Work" means labor, materials, supplies, furnished, or performed by Contractor with respect to the Project.

Words and phrases defined elsewhere in the Contract Documents and other parts of the Contract and the General Conditions shall (unless otherwise specified) have the same meanings throughout this Waiver of Lien.

IN WITNESS WHEREOF, Contractor has caused this Waiver of Lien to be duly executed and the seal of Contractor to be affixed as of the date of the Requisition by the undersigned officer who is duly authorized to do so.

(Contractor)

By: _____
Name:
Title:

Subscribed and sworn to before me
this ____ day of _____, _____

Notary Public

SUBCONTRACTOR'S PARTIAL RELEASE AND WAIVER OF LIEN

_____ ("Subcontractor"), in connection with the performance of a project of LOWER MANHATTAN DEVELOPMENT CORPORATION with offices at One Liberty Plaza, 20th Floor, New York, New York 10006 ("Owner"), commonly known as the WTC Memorial Trees for the World Trade Center Memorial, Memorial Museum and related facilities ("Project"), and the payment to _____ ("Contractor") of certain sums requisitioned by Contractor pursuant to its Application for Payment No. _____ dated _____, _____ (the "Requisition") for Work supplied, furnished or performed for the Project to the date of the Requisition. Upon receipt of payment in the amount of \$ _____, which amount Subcontractor, for Owner's benefit, DOES HEREBY CERTIFY AND ACKNOWLEDGE constitutes all sums due and owing to Subcontractor in accordance with Subcontractor's agreement with Contractor (the "Subcontract") with respect thereto (other than sums withheld by Contractor), for Work supplied, furnished or performed for the Project to the date of the Requisition, Subcontractor, for Owner's benefit, DOES HEREBY FOREVER RELEASE AND WAIVE for Subcontractor, its successors and assigns any and all rights, claims and demands Subcontractor has or may have against Owner, LMDC, Contractor or the Port Authority of New York and New Jersey (the "Port Authority") (including any rights which Subcontractor has or may have pursuant to the New York Lien Law to file any lien or notice of lien against the Project or any property of Owner, LMDC or the Port Authority on account of or deriving from Work performed or furnished for the Project to the Requisition date) other than (1) claims for any portion of the amount certified above which Owner does not pay to Contractor and which the parties dispute and (2) unpaid amounts of prior requisitions which were properly prepared and submitted and which neither Owner nor Contractor dispute. As used herein, "Work" means labor, materials, supplies, furnished, or performed by Subcontractor with respect to the Project.

Words and phrases defined elsewhere in the Contract Documents and other parts of the Contract and the General Conditions shall (unless otherwise specified) have the same meanings throughout this Waiver of Lien.

IN WITNESS WHEREOF, Subcontractor has caused this Waiver of Lien to be duly executed and the seal of Subcontractor to be affixed as of the date of the Requisition by the undersigned officer who is duly authorized to do so.

(Contractor)

By: _____
Name:
Title:

Subscribed and sworn to before me
this ____ day of _____, _____

Notary Public

STANDARD BUSINESS BACKGROUND QUESTIONNAIRE

[attached]



LOWER MANHATTAN DEVELOPMENT CORPORATION
STANDARD BUSINESS BACKGROUND QUESTIONNAIRE

INSTRUCTIONS

- This Questionnaire shall be completed on behalf of the Firm by an individual who is knowledgeable about the past and present operations of the firm and its policies.
- Firms intending to bid as joint venturers should submit a separate Questionnaire for each joint venturer.
- Whenever more space is needed to answer any question, or you wish to give further explanation, complete by attaching extra pages.
- All questions must be answered. If a particular question does not apply, the response must state "Not Applicable" ("NA").
- Any suits, liens, judgments, litigation, violations, and administrative or court actions under appeal must be disclosed.

NOTE: Please indicate whether you believe that any of the information supplied herein is confidential and should be exempt from disclosure under the New York Freedom of Information Law: _____yes, _____no. If you checked "yes" you must identify the information you feel is confidential by placing an asterisk in front of the appropriate question number(s) and attach an additional sheet(s) explaining the basis for such claim(s).

DEFINITIONS

For purposes of this Questionnaire, the following terms shall have the following meanings:

- A. "Affiliate" shall mean any person or entity that is directly or indirectly controlled by the person or entity to which the question relates, or any person or entity that directly or indirectly controls such person or entity. For purposes of this definition, control means the power to direct the management of the firm, person or other entity, whether through ownership of shares, the right to designate the Board of Directors, contract or otherwise.
- B. "Principal" shall mean any person who is or has been, within the past five (5) years, either an owner of five percent (5%) or more of the firm's shares, one of the firm's five (5) largest shareholders or a director, officer, partner or proprietor of the Firm.
- C. "Key Person" shall mean any individual, not identified in this Questionnaire as a Principal, who participates in policy making, financial decisions, or the Firm's operations in relation to the project.

GENERAL INFORMATION

1. LEGAL NAME OF FIRM (hereafter, the "Firm") _____
EMPLOYER IDENTIFICATION NUMBER _____
DBA NAME, IF ANY _____
MAILING ADDRESS _____ PHONE NO. (____) _____
CITY _____ COUNTY _____ STATE _____ ZIP _____ FAX NO. (____) _____
ACTUAL LOCATION _____

FIRM HEADQUARTERS (if different) _____

E-MAIL ADDRESS _____ WEB SITE _____

2. CONTACT NAME FOR QUESTIONNAIRE _____ TITLE _____ PHONE NO. _____
3. TYPE OF FIRM (check only one) ___ CORPORATION ___ PARTNERSHIP ___ PROPRIETORSHIP ___ JOINT VENTURE ___ LLC ___ LLP
4. HOW MANY YEARS HAS THE FIRM BEEN IN BUSINESS? _____ UNDER THE SAME NAME? _____ FORMER NAME(S): _____
- 4a. WAS THE FIRM PURCHASED AS AN EXISTING BUSINESS BY ITS PRESENT OWNER(S) NO ___ YES ___ (IF YES PROVIDE INFORMATION)
DATE PURCHASED ___/___/___ PREVIOUS OWNER(S) NAME(S): _____
5. WHAT IS THE FIRM'S BONDING RANGE? \$ _____ SINGLE PROJECT \$ _____ AGGREGATE (ALL PROJECTS)
6. ARE YOU CERTIFIED MBE _____ WBE _____ IF SO, BY WHOM? _____

OWNERSHIP, MANAGEMENT, AFFILIATION

7. **Principals:** Identify each person who is, or has been within the past five (5) years, an owner of five percent (5.0%) or more of the Firm's shares, or one of the five (5) largest shareholders or a director, an officer, a partner or a proprietor. Fill in name, % owned, office held and indicate by Y or N whether the individual is a director, officer, partner or Key Person:

FIRST NAME	MI	LAST NAME	DATE OF BIRTH	% OWNED	DIRECTOR (Y OR N)	OFFICER (Y OR N)	TITLE	PARTNER (Y OR N)	KEY PERSON (Y OR N)

8. **Key Persons:** Identify any individual, not listed in your answers to question 7 and identified as a Principal, who participates in policy making, financial decisions or the Firm's operations in relation to the project:

FIRST NAME	MI	LAST NAME	DATE OF BIRTH	TITLE

9. **Ownership of Other Firms:** Identify any other firms in which, now or in the past five (5) years, the Firm or any Principals or Key Persons, either owned or owns five percent (5.0%) or more of the shares of, or was or is one of the five (5) largest shareholders, a director, officer, partner or proprietor of such other firm:

FEDERAL ID NO.	% OWNED	FIRM/COMPANY NAME	FIRM/COMPANY ADDRESS

10. **Affiliates:** Identify any Affiliate not listed in your answers to question 9.

FEDERAL ID NO.	COMPANY NAME	ADDRESS

11. Identify the name and types of any professional or occupational license(s) (e.g., attorney, CPA, architect, engineer, securities, insurance, etc.) ever held by the Firm, Principal or Key Person and provide the information below.

TYPE OF LICENSE	LICENSING AUTHORITY	INDIVIDUAL NAMED ON LICENSE	LICENSE NUMBER	DATE HELD FROM (MO/YR TO MO/YR)

12. Are any persons identified in your answers to questions 7, 8, or 10:

- (a) Present or past employees of the Foundation/LMDC No _____ Yes _____
- (b) Related by kinship or marriages to any present or past employees of the Foundation/LMDC? No _____ Yes _____

If you answered "yes" to questions 12(a) or 12(b), provide name(s) of such individual(s) and indicate his or her relationship to the current/former Foundation/LMDC employee.

FINANCIAL INFORMATION

- 13. Attach a copy of the Firm's most recent audited annual financial statement, include (if any) the auditor's report and accompanying footnotes.
- 14. For the purpose of this contract, is any other person or entity guaranteeing the performance of, or otherwise providing financial assistance to, your Firm? If so, describe the form of assistance and list the name(s) and federal tax identification number(s) ("TIN") of each person or entity:

FORM OF ASSISTANCE	INDIVIDUAL	COMPANY NAME	FEDERAL TIN	ADDRESS

OTHER INFORMATION

15. For the Firm or any individual, firm or Affiliate identified in questions 7 through 10 above; (a) list and describe all judgments, liens or claims over \$25,000 filed against the Firm, individual, firm or Affiliate and remaining undischarged or unsatisfied for more than ninety (90) days; and (b) list and describe all liquidated damages assessed. Also list any litigation currently pending against the Firm, individual, firm, or Affiliate, if the judgment sought relates to the type of work to be performed for the Foundation, or could have a material adverse financial impact on the Firm, individual, firm or Affiliate.

INDIVIDUAL, FIRM OR AFFILIATE	LIENS, CLAIMS, LITIGATION INDEX/DOCKET NO.	LIQUIDATED DAMAGES

16. Within the past five (5) years has the Firm, Principal, Key Person, or Affiliate been the subject of any of the following (respond to each question and describe in detail the circumstances of each affirmative answer; attach additional pages if necessary):

(a) a judgment of conviction for any business-related conduct constituting a crime under state or Federal law? No _____ Yes _____

(b) a criminal investigation or indictment for any business-related conduct constituting a crime under state or Federal law? No _____ Yes _____

(c) a grant of immunity for any business-related conduct constituting a crime under state or Federal law? No _____ Yes _____

- (d) any felony or misdemeanor charges pending that were filed either before or during their employment or affiliation with the Firm? No _____ Yes _____
- (e) a Federal or state suspension or debarment? No _____ Yes _____
- (f) a finding of non-responsibility by any government agency? No _____ Yes _____
- (g) a denial or revocation of prequalification? No _____ Yes _____
- (h) a voluntary exclusion from bidding/contracting agreement? No _____ Yes _____
- (i) any administrative or civil action seeking specific performance or restitution on any public works contract except any disputed work proceeding? No _____ Yes _____
- (j) an OSHA Citation and Notification of Penalty containing a violation classified as serious? No _____ Yes _____
- (k) an OSHA Citation and Notification of Penalty containing a violation classified as willful? No _____ Yes _____
- (l) a prevailing wage or supplement payment violation? No _____ Yes _____
- (m) a state labor law violation deemed willful? No _____ Yes _____
- (n) any other federal or state citations, notices, violation orders, pending administrative hearings or proceedings or determinations of a violation of any labor law or regulation? No _____ Yes _____
- (o) any criminal investigation, felony indictment or conviction concerning formation of, or any business association with, any allegedly false or fraudulent women's, minority or disadvantaged business enterprise? No _____ Yes _____
- (p) any denial, decertification, revocation or forfeiture of Women's Business Enterprise, Minority Business Enterprise or Disadvantaged Business Enterprise status? No _____ Yes _____
- (q) rejection of a low bid on a local, state or federal contract for failure to meet statutory affirmative action or M/WBE requirements? No _____ Yes _____

(r) consent order with the NYS Department of Environmental Conservation, or a federal, state or local government enforcement determination involving a violation of federal or state environmental laws? No_____ Yes_____

(s) any citations, notices, violation orders, pending administrative hearings or proceedings or determinations for violations of:
• Federal, state or local health laws, rules or regulations? No_____ Yes_____

• Federal, state or local environmental laws, rules or regulations? No_____ Yes_____

• unemployment insurance or workers compensation coverage or claim requirements? No_____ Yes_____

• ERISA (Employee Retirement Income Security Act)? No_____ Yes_____

• Federal, state or local human rights laws? No_____ Yes_____

• Federal or state security laws? No_____ Yes_____

• a request to withdraw a bid submitted to a public owner or any claim of an error on a bid submitted to a public owner? No_____ Yes_____

(t) any bankruptcy or reorganization proceeding? No_____ Yes_____

(u) any suspension or revocation of any business or professional license, certificates or certifications? No_____ Yes_____

(v) a denial of application and for a professional or trade license? No_____ Yes_____

17. Within the past five (5) years has the Firm, Principal, or Key Person (respond to each question and detail the circumstances of each affirmative answer; attach additional pages if necessary):

(a) filed or submitted to any government agency, employee or representative any document that the Firm, Affiliate, Principal or Key Person knew to contain a false statement or false information? No__ Yes__

(b) falsified any business record? No__ Yes__

(c) given or offered to give money or any thing of value or any benefit to any labor official or public servant with intent to influence that person with respect to his or her official acts, duties or decisions as a labor official or public servant? No__ Yes__

(d) given or offered to give money or any thing of value or any benefit to any official or employee of a business with intent to induce that person or employee to engage in unethical or illegal business practices? No__ Yes__

(e) agreed with any person to submit a proposal, price or bid below prevailing market rate? No__ Yes__

(f) been sued or paid a settlement of claim related to the performance of professional services? No__ Yes__

18. Within the past five (5) years, has the Firm ever:

(a) failed to file any required tax returns or failed to pay any applicable Federal, state or New York City taxes, or other assessed New York City charges including, but not limited to, water and sewer charges?

No ___ Yes ___

(b) had, or does it presently have, any delinquent Federal, state or New York City taxes outstanding?

No ___ Yes ___

If you answered "yes" to questions 18(a) or 18(b), supply details.

19. Provide any supplemental information the Firm desires to have considered as part of its response to this Questionnaire.

CERTIFICATION

The undersigned recognizes that this Questionnaire is submitted for the express purpose of inducing the Foundation to award a contract or approve a subcontract; acknowledges that the Foundation may in its discretion, by means which it may choose, determine the truth and accuracy of all statements made herein; authorizes the Foundation, LMDC, the United States Department of Housing and Urban Development, or their agents to contact any entity named in this Questionnaire and any attachments for the purposes of verifying the information supplied; acknowledges that the intentional submission of false or misleading information may constitute a felony under New York Penal Law Section 210.40 or a misdemeanor under Penal Law Section 210.35 or Section 210.45, and may also be punishable by a fine of up to \$10,000 or imprisonment of up to five years under 18 U.S.C. Section 1001; represents that the information submitted in this Questionnaire and any attached pages is true, accurate and complete, and agrees to notify Foundation in writing of any change in circumstances occurring after the submission of this questionnaire and during the performance of any contract awarded.

Sworn to before me this _____ day of _____, _____ .

Signature of Officer

Notary Public

Title

Commission Expiration Date



SECTION 01320 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
 - 1. Preliminary Construction Schedule.
 - 2. Contractor's Construction Schedule.
 - 3. Submittals Schedule.
 - 4. Daily construction reports.
 - 5. Material location reports.
 - 6. Field condition reports.
 - 7. Special reports.
- B. Related Sections include the following:
 - 1. Division 1 Section "Submittal Procedures" for submitting schedules and reports.

1.3 DEFINITIONS

- A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.
 - 1. Critical activities are activities on the critical path. They must start and finish on the planned early start and finish times.
 - 2. Predecessor Activity: An activity that precedes another activity in the network.
 - 3. Successor Activity: An activity that follows another activity in the network.
- B. Cost Loading: The allocation of the Schedule of Values for the completion of an activity as scheduled. The sum of costs for all activities must equal the total Contract Sum, unless otherwise approved by Architect.
- C. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of Project.
- D. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.

- E. Event: The starting or ending point of an activity.
- F. Float: The measure of leeway in starting and completing an activity.
 - 1. Float time belongs to Owner.
 - 2. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the successor activity.
 - 3. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.
- G. Fragnet: A partial or fragmentary network that breaks down activities into smaller activities for greater detail.
- H. Major Area: A story of construction, a separate building, or a similar significant construction element.
- I. Milestone: A key or critical point in time for reference or measurement.
- J. Network Diagram: A graphic diagram of a network schedule, showing activities and activity relationships.
- K. Resource Loading: The allocation of manpower and equipment necessary for the completion of an activity as scheduled.

1.4 SUBMITTALS

- A. Qualification Data: For scheduling consultant.
- B. Preliminary Construction Schedule: Submit Four(4) opaque copies.
 - 1. Approval of cost-loaded preliminary construction schedule will not constitute approval of Schedule of Values for cost-loaded activities.
- C. Contractor's Construction Schedule: Submit Four (4) opaque copies of initial schedule, large enough to show entire schedule for entire construction period.
 - 1. Submit an electronic copy of schedule, using Primavera "P3", and Adobe "PDF" software, on CD-R, and labeled to comply with requirements for submittals. Include type of schedule (Initial or Updated) and date on label.
- D. CPM Reports: Concurrent with CPM schedule, submit Four (4) copies of each of the following computer-generated reports. Format for each activity in reports shall contain activity number, activity description, cost and resource loading, original duration, remaining duration, early start date, early finish date, late start date, late finish date, and total float in calendar days.
 - 1. Activity Report: List of all activities sorted by activity number and then early start date, or actual start date if known.
 - 2. Logic Report: List of preceding and succeeding activities for all activities, sorted in ascending order by activity number and then early start date, or actual start date if known.
 - 3. Total Float Report: List of all activities sorted in ascending order of total float.

4. Earnings Report: Compilation of Contractor's total earnings from commencement of the Work until most recent Application for Payment.
- E. Daily Construction Reports: Submit Two (2) copies at weekly intervals.
- F. Material Location Reports: Submit Two (2) copies at weekly intervals.
- G. Field Condition Reports: Submit Two (2) copies at time of discovery of differing conditions.
- H. Special Reports: Submit Two (2) copies at time of unusual event.

1.5 QUALITY ASSURANCE

- A. Scheduling Consultant Qualifications: An experienced specialist in CPM scheduling and reporting, with capability of producing CPM reports and diagrams within 24 hours of Architect or Owner's request.

1.6 COORDINATION

- A. Coordinate preparation and processing of schedules and reports with performance of construction activities.
- B. Coordinate Contractor's Construction Schedule with the Schedule of Values, list of subcontracts, Submittals Schedule, progress reports, payment requests, and other required schedules and reports.
 1. Secure time commitments for performing critical elements of the Work from parties involved.
 2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

PART 2 - PRODUCTS

2.1 SUBMITTALS SCHEDULE

- A. Preparation: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, resubmittal, ordering, manufacturing, fabrication, and delivery when establishing dates.
 1. Coordinate Submittals Schedule with list of subcontracts, the Schedule of Values, and Contractor's Construction Schedule.
 2. Initial Submittal: Submit concurrently with preliminary Bar-Chart Schedule. Include all submittals required during the project. List those required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
 - a. Show submittals on the Preliminary Construction Schedule, instead of tabulating them separately.

3. Final Submittal: Submit concurrently with the first complete submittal of Contractor's Construction Schedule.

2.2 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

- A. Procedures: Comply with procedures contained in AGC's "Construction Planning & Scheduling."
- B. Time Frame: Extend schedule from date established for the Notice of Award to date of Final Completion.
 1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.
- C. Activities: Comply with the following:
 1. Procurement Activities: Include procurement process activities for long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
 2. Submittal Review Time: Include review and resubmittal times indicated in Division 1 Section "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's Construction Schedule with Submittals Schedule.
 3. Final Completion: Indicate completion in advance of date established for Final Completion, and allow time for Architect's and Owner's administrative procedures necessary for certification of Final Completion.
- D. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.
 1. Phasing: Arrange list of activities on schedule by phase.
 2. Work under More Than One Contract: Include a separate activity for each contract.
 3. Work by Owner: Include a separate activity for each portion of the Work performed by Owner.
 4. Products Ordered in Advance: Include a separate activity for each product. Delivery dates indicated stipulate the earliest possible delivery date.
 5. Owner-Furnished Products: Include a separate activity for each product. Delivery dates indicated stipulate the earliest possible delivery date.
 6. Work Restrictions: Show the effect of the following items on the schedule:
 - a. Coordination with existing construction.
 - b. Limitations of continued occupancies.
 - c. Uninterruptible services.
 - d. Partial occupancy before Final Completion.
 - e. Use of premises restrictions.
 - f. Provisions for future construction.
 - g. Seasonal variations.
 - h. Environmental control.

7. Work Stages: Indicate important stages of construction for each major portion of the Work, including, but not limited to, the following:
 - a. Subcontract awards.
 - b. Submittals.
 - c. Purchases.
 - d. Mockups.
 - e. Fabrication.
 - f. Sample testing.
 - g. Deliveries.
 - h. Installation.
 - i. Tests and inspections.
 - j. Adjusting.
 - k. Maintenance.
 8. Area Separations: Identify each major area of construction for each major portion of the Work. Indicate where each construction activity within a major area must be sequenced or integrated with other construction activities.
 9. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, and Final Completion.
- E. Cost Correlation: At the head of schedule, provide a cost correlation line, indicating planned and actual costs. On the line, show dollar volume of the Work performed as of dates used for preparation of payment requests.
1. Refer to General Conditions for cost reporting and payment procedures.
 2. Contractor shall assign cost to construction activities on the CPM schedule. Costs shall not be assigned to submittal activities unless specified otherwise but may, with Architect's approval, be assigned to fabrication and delivery activities. Costs shall be under required principal subcontracts for testing and commissioning activities, operation and maintenance manuals, punch list activities, Project Record Documents, and demonstration and training (if applicable), in the amount of 5 percent of the Contract Sum.
 3. Each activity cost shall reflect an accurate value subject to approval by Architect.
 4. Total cost assigned to activities shall equal the total Contract Sum.
- F. Contract Modifications: For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis using fragnets to demonstrate the effect of the proposed change on the overall project schedule.
- G. Computer Software: Prepare schedules using a program that has been developed specifically to manage construction schedules.

2.3 PRELIMINARY CONSTRUCTION SCHEDULE

- A. Bar-Chart Schedule: Submit preliminary horizontal bar-chart-type construction schedule within Seven (7) days of date established for the Notice of Award.

- B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line. Outline significant construction activities for first Sixty (60) days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.

2.4 CONTRACTOR'S CONSTRUCTION SCHEDULE (CPM SCHEDULE)

- A. General: Prepare network diagrams using AON (activity-on-node) format.
- B. Preliminary Network Diagram: Submit diagram within Fourteen (14) days of date established for The Notice of Award. Outline significant construction activities for the first Sixty (60) days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.
- C. CPM Schedule: Prepare Contractor's Construction Schedule using a computerized, time-scaled CPM network analysis diagram for the Work.
 - 1. Develop network diagram in sufficient time to submit CPM schedule so it can be accepted for use no later than Thirty (30) days after date established for the Notice of Award.
 - a. Failure to include any work item required for performance of this Contract shall not excuse Contractor from completing all work within applicable completion dates, regardless of Architect's or Owner's approval of the schedule.
 - 2. Conduct educational workshops to train and inform key Project personnel, including subcontractors' personnel, in proper methods of providing data and using CPM schedule information.
 - 3. Establish procedures for monitoring and updating CPM schedule and for reporting progress. Coordinate procedures with progress meeting and payment request dates.
 - 4. Use "one workday" as the unit of time. Include list of nonworking days and holidays incorporated into the schedule.
- D. CPM Schedule Preparation: Prepare a list of all activities required to complete the Work. Using the preliminary network diagram, prepare a skeleton network to identify probable critical paths.
 - 1. Activities: Indicate the estimated time duration, sequence requirements, and relationship of each activity in relation to other activities. Include estimated time frames for the following activities:
 - a. Preparation and processing of submittals.
 - b. Mobilization and demobilization.
 - c. Purchase of materials.
 - d. Delivery.
 - e. Fabrication.
 - f. Utility interruptions.
 - g. Installation.
 - h. Work by Owner that may affect or be affected by Contractor's activities.
 - i. Maintenance.

2. Critical Path Activities: Identify critical path activities, including those for interim completion dates. Scheduled start and completion dates shall be consistent with Contract milestone dates.
 3. Processing: Process data to produce output data on a computer-drawn, time-scaled network. Revise data, reorganize activity sequences, and reproduce as often as necessary to produce the CPM schedule within the limitations of the Contract Time.
 4. Format: Mark the critical path. Locate the critical path near center of network; locate paths with most float near the edges.
 - a. Subnetworks on separate sheets are permissible for activities clearly off the critical path.
- E. Initial Issue of Schedule: Prepare initial network diagram from a list of straight "early start-total float" sort. Identify critical activities. Prepare tabulated reports showing the following:
1. Contractor or subcontractor and the Work or activity.
 2. Description of activity.
 3. Principal events of activity.
 4. Immediate preceding and succeeding activities.
 5. Early and late start dates.
 6. Early and late finish dates.
 7. Activity duration in workdays.
 8. Total float or slack time.
 9. Average size of workforce.
 10. Dollar value of activity (coordinated with the Schedule of Values).
- F. Schedule Updating: Concurrent with making revisions to schedule, prepare tabulated reports showing the following:
1. Identification of activities that have changed.
 2. Changes in early and late start dates.
 3. Changes in early and late finish dates.
 4. Changes in activity durations in workdays.
 5. Changes in the critical path.
 6. Changes in total float or slack time.
 7. Changes in the Contract Time.
- G. Value Summaries: Prepare two cumulative value lists, sorted by finish dates.
1. In first list, tabulate activity number, early finish date, dollar value, and cumulative dollar value.
 2. In second list, tabulate activity number, late finish date, dollar value, and cumulative dollar value.
 3. In subsequent issues of both lists, substitute actual finish dates for activities completed as of list date.
 4. Prepare list for ease of comparison with payment requests; coordinate timing with progress meetings.
 - a. In both value summary lists, tabulate "actual percent complete" and "cumulative value completed" with total at bottom.

2.5 REPORTS

- A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:
1. List of subcontractors at Project site.
 2. List of separate contractors at Project site.
 3. Approximate count of personnel at Project site.
 4. Equipment at Project site.
 5. Material deliveries.
 6. High and low temperatures and general weather conditions.
 7. Accidents.
 8. Meetings and significant decisions.
 9. Visitors to site.
 10. Unusual events (refer to special reports).
 11. Stoppages, delays, shortages, and losses.
 12. Meter readings and similar recordings.
 13. Emergency procedures.
 14. Orders and requests of authorities having jurisdiction.
 15. Change Orders received and implemented.
 16. Services connected and disconnected.
 17. Equipment or system tests and startups.
 18. Partial Completions and occupancies.
 19. Final Completions authorized.
- B. Material Location Reports: At weekly intervals, prepare and submit a comprehensive list of materials delivered to and stored at Project site. List shall be cumulative, showing materials previously reported plus items recently delivered. Include with list a statement of progress on and delivery dates for materials or items of equipment fabricated or stored away from Project site.
- C. Field Condition Reports: Immediately on discovery of a difference between field conditions and the Contract Documents, prepare and submit a detailed report. Submit with a request for information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

2.6 SPECIAL REPORTS

- A. General: Submit special reports directly to Owner within One (1) day of an occurrence. Distribute copies of report to parties affected by the occurrence.
- B. Reporting Unusual Events: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, response by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise Owner in advance when these events are known or predictable.

PART 3 - EXECUTION

3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Scheduling Consultant: Engage a consultant to provide planning, evaluation, and reporting using CPM scheduling.
 - 1. In-House Option: Owner may waive the requirement to retain a consultant if Contractor employs skilled personnel with experience in CPM scheduling and reporting techniques. Submit qualifications for approval by Owner.
 - 2. Meetings: Scheduling consultant shall attend all meetings related to Project progress, alleged delays, and time impact.
- B. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities.
 - 1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
 - 2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
 - 3. As the Work progresses, indicate Actual Completion percentage for each activity.
- C. Distribution: Distribute copies of approved schedule to Owner and Architect and other parties identified by Contractor with a need-to-know schedule responsibility.
 - 1. When revisions are made, distribute updated schedules to the same parties. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

END OF SECTION 01320

SECTION 01330 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.
- B. Related Sections include the following:
 - 1. Division 1 Section "Construction Progress Documentation" for submitting schedules and reports, including Contractor's Construction Schedule and the Submittals Schedule.
 - 2. Division 1 Section "Closeout Procedures" for submitting warranties.
 - 3. Division 1 Section "Project Record Documents" for submitting Record Specifications, and Record Product Data.
 - 4. Divisions 2 through 16 Sections for specific requirements for submittals in those Sections.

1.3 DEFINITIONS

- A. Action Submittals: Written and graphic information that requires Architect's responsive action.
- B. Informational Submittals: Written information that does not require Architect's responsive action. Submittals may be rejected for not complying with requirements.

1.4 SUBMITTAL PROCEDURES

- A. General: Electronic copies of CAD Drawings of the Contract Drawings may be provided by Owner for Contractor's use in preparing submittals.
- B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
 - 1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
 - 2. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
 - a. Architect and Owner reserve the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

- C. Submittals Schedule: Comply with requirements in Division 1 Section "Construction Progress Documentation" for list of submittals and time requirements for scheduled performance of related construction activities.
- D. Processing Time: Allow enough time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Owner's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
1. Initial Review: Allow (15) Fifteen days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Owner or Architect will advise Contractor when a submittal being processed must be delayed for coordination.
 2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
 3. Resubmittal Review: Allow (15) Fifteen days for review of each resubmittal.
- E. Identification: Place a permanent label or title block on each submittal for identification.
1. Indicate name of firm or entity that prepared each submittal on label or title block.
 2. Provide a space approximately 6 by 8 inches (150 by 200 mm) on label or beside title block to record Contractor's review and approval markings and action taken by Architect and Owner.
 3. Include the following information on label for processing and recording action taken:
 - a. Project name.
 - b. Date.
 - c. Name and address of Architect and Owner.
 - d. Name and address of Contractor.
 - e. Name and address of subcontractor.
 - f. Name and address of supplier.
 - g. Name of manufacturer.
 - h. Submittal number or other unique identifier, including revision identifier.
 - 1) Submittal number shall use Specification Section number followed by a decimal point and then a sequential number (e.g., 06100.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., 06100.01.A).
- F. Submittal Preparation: Place Transmittal Cover Sheet on each submittal for identification. Complete all required information, as described in Paragraph I, before submitting to Owner. Submittals received without Transmittal Cover Sheet or with incomplete information on cover sheet will be returned for resubmission.
- G. Deviations: Highlight or otherwise specifically identify deviations from the Contract Documents on submittals.

- H. Additional Copies: Unless additional copies are required for final submittal, and unless Architect or Owner observes noncompliance with provisions in the Contract Documents, initial submittal may serve as final submittal.
1. Submit one copy of submittal to concurrent reviewer in addition to specified number of copies to Owner.
 2. Additional copies submitted for maintenance manuals will be marked with action taken and will be returned.
- I. Transmittal: Package each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Owner will return submittals, without review, received from sources other than Contractor.
1. Transmittal Form: Provide locations on form for the following information:
 - a. Project name.
 - b. Date.
 - c. Destination (To:).
 - d. Source (From:).
 - e. Names of subcontractor, manufacturer, and supplier.
 - f. Category and type of submittal.
 - g. Submittal purpose and description.
 - h. Specification Section number and title.
 - i. Drawing number and detail references, as appropriate.
 - j. Transmittal number, numbered consecutively.
 - k. Submittal and transmittal distribution record.
 - l. Remarks.
 - m. Signature of transmitter.
 2. On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Architect, and Owner on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same label information as related submittal.
- J. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
1. Note date and content of previous submittal.
 2. Note date and content of revision in label or title block and clearly indicate extent of revision.
 3. Resubmit submittals until they are marked, "Approved".
- K. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.
- L. Use for Construction: Use only final submittals with mark indicating, "Approved as Noted" or "Approved" taken by Architect and Owner.

1.5 CONTRACTOR'S USE OF OWNER'S CAD FILES

1. General: At Contractor's written request, copies of Owner's CAD files may be provided to Contractor for Contractor's use in connection with Project.

PART 2 - PRODUCTS

2.1 ACTION SUBMITTALS

- A. General: Prepare and submit Action Submittals required by individual Specification Sections.
 1. Submit electronic submittals directly to extranet specifically established for Project.
- B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
 1. If information must be specially prepared for submittal because standard printed data are not suitable for use, submit as Shop Drawings, not as Product Data.
 2. Mark each copy of each submittal to show which products and options are applicable.
 3. Include the following information, as applicable:
 - a. Manufacturer's written recommendations.
 - b. Manufacturer's product specifications.
 - c. Manufacturer's installation instructions.
 - d. Standard color charts.
 - e. Manufacturer's catalog cuts.
 - f. Wiring diagrams showing factory-installed wiring.
 - g. Printed performance curves.
 - h. Operational range diagrams.
 - i. Mill reports.
 - j. Standard product operation and maintenance manuals.
 - k. Compliance with specified referenced standards.
 - l. Testing by recognized testing agency.
 - m. Application of testing agency labels and seals.
 - n. Notation of coordination requirements.
 4. Submit Product Data before or concurrent with Samples.
 5. Number of Copies: Submit Five (5) copies of Product Data, unless otherwise indicated. Architect, through Owner will return Two (2) copies. Mark up and retain one returned copy as a Project Record Document.
- C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data, unless submittal of Owner's CAD Drawings are otherwise permitted.
 1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
 - a. Dimensions.

- b. Identification of products.
 - c. Fabrication and installation drawings.
 - d. Roughing-in and setting diagrams.
 - e. Wiring diagrams showing field-installed wiring, including power, signal, and control wiring.
 - f. Shopwork manufacturing instructions.
 - g. Templates and patterns.
 - h. Schedules.
 - i. Design calculations.
 - j. Compliance with specified standards.
 - k. Notation of coordination requirements.
 - l. Notation of dimensions established by field measurement.
 - m. Relationship to adjoining construction clearly indicated.
 - n. Seal and signature of professional engineer if specified.
 - o. Wiring Diagrams: Differentiate between manufacturer-installed and field-installed wiring.
2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches (215 by 280 mm) but no larger than 30 by 40 inches (750 by 1000 mm).
 3. Number of Copies: Submit Five (5) opaque copies of each submittal, unless copies are required for operation and maintenance manuals. Submit Seven (7) copies where copies are required for operation and maintenance manuals. Architect and Owner will retain Five (5) copies; remainder will be returned. Mark up and retain one returned copy as a Project Record Drawing.
- D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.
1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
 2. Identification: Attach label on unexposed side of Samples that includes the following:
 - a. Generic description of Sample.
 - b. Product name and name of manufacturer.
 - c. Sample source.
 - d. Number and title of appropriate Specification Section.
 3. Disposition: Maintain sets of approved Samples, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
 - a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
 - b. Samples not incorporated into the Work, or otherwise not designated as Owner's property, are the property of Contractor.
 4. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and

physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.

- a. Number of Samples: Submit Five (5) sets of Samples. Architect and Owner will retain Three (3) Sample sets; remainder will be returned. Mark up and retain one returned Sample set as a Project Record Sample.
- E. Product Schedule or List: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:
1. Type of product. Include unique identifier for each product.
 2. Number of Copies: Submit Five (5) copies of product schedule or list, unless otherwise indicated. Architect, through Owner will return Two (2) copies.
 - a. Mark up and retain one returned copy as a Project Record Document.
- F. Contractor's Construction Schedule: Comply with requirements specified in Division 1 Section "Construction Progress Documentation" for Construction Manager's action.
- G. Submittals Schedule: Comply with requirements specified in Division 1 Section "Construction Progress Documentation."
- H. Application for Payment: Comply with requirements specified in General Conditions.
- I. Schedule of Values: Comply with requirements specified in General Conditions.
- J. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:
1. Name, address, and telephone number of entity performing subcontract or supplying products.
 2. Number and title of related Specification Section(s) covered by subcontract.
 3. Drawing number and detail references, as appropriate, covered by subcontract.
 4. Standard Background Business Questionnaire for each subcontract.
 5. Number of Copies: Submit Five (5) copies of subcontractor list, unless otherwise indicated. Owner will return Two (2) copies.
 - a. Mark up and retain one returned copy as a Project Record Document.

2.2 INFORMATIONAL SUBMITTALS

- A. General: Prepare and submit Informational Submittals required by other Specification Sections.
1. Number of Copies: Submit Three (3) copies of each submittal, unless otherwise indicated. Architect and Owner will not return copies.

2. Certificates and Certifications: Provide a notarized statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
 3. Test and Inspection Reports: Comply with requirements specified in Division 1 Section "Quality Requirements."
- B. Contractor's Construction Schedule: Comply with requirements specified in Division 1 Section "Construction Progress Documentation."
 - C. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
 - D. Installer Certificates: Prepare written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
 - E. Manufacturer Certificates: Prepare written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
 - F. Product Certificates: Prepare written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
 - G. Material Certificates: Prepare written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
 - H. Material Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
 - I. Product Test Reports: Prepare written reports indicating current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
 - J. Schedule of Tests and Inspections: Comply with requirements specified in Division 2.
 - K. Preconstruction Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
 - L. Compatibility Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product.
 - M. Field Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.

- N. Maintenance Data: Prepare written and graphic instructions and procedures for operation and normal maintenance of products and equipment. Comply with requirements specified in Division 2.
- O. Insurance Certificates and Bonds: Prepare written information indicating current status of insurance or bonding coverage. Include name of entity covered by insurance or bond, limits of coverage, amounts of deductibles, if any, and term of the coverage.

2.3 DELEGATED DESIGN

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
 - 1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.
- B. Delegated-Design Submittal: In addition to Shop Drawings, Product Data, and other required submittals, submit Five (5) copies of a statement, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.
 - 1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

- A. Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Owner.
- B. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 ARCHITECT'S AND OWNER'S / ACTION

- A. General: Architect and Owner will not review submittals that do not bear Contractor's approval stamp and will return them without action.
- B. Action Submittals: Architect and Owner will review each submittal, make marks to indicate corrections or modifications required, and return it. Architect and Owner will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken, as follows:

1. "A": Approved.
 2. "AAN": Approved As Noted (Submit Final for Records).
 3. "NAT": No Action Taken.
 4. "RAR": Revise and Resubmit.
 5. "REJ": Rejected.
- C. Informational Submittals: Architect and Owner will review each submittal and will return it, if it does not comply with requirements. Architect and Owner will forward each submittal to appropriate party.
- D. Partial submittals are not acceptable, will be considered nonresponsive, and will be returned without review.
- E. Submittals not required by the Contract Documents may not be reviewed and may be discarded.

END OF SECTION 01330

SECTION 01400 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for quality assurance and quality control.
- B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
 - 1. Specific quality-assurance and -control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
 - 2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and -control procedures that facilitate compliance with the Contract Document requirements.
 - 3. Requirements for Contractor to provide quality-assurance and -control services required by Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.
- C. Related Sections include the following:
 - 1. Division 1 Section "Construction Progress Documentation" for developing a schedule of required tests and inspections.
 - 2. Division 2 for specific test and inspection requirements.

1.3 DEFINITIONS

- A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.
- B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by Architect or Owner.
- C. Mockups: Full-size, physical assemblies that are constructed on-site. Mockups are used to verify selections made under sample submittals, to demonstrate aesthetic effects and, where indicated, qualities of materials and execution, and to review construction, coordination, testing,

or operation; they are not Samples. Approved mockups establish the standard by which the Work will be judged.

- D. Laboratory Mockups: Full-size, physical assemblies that are constructed at testing facility to verify performance characteristics.
- E. Preconstruction Testing: Tests and inspections that are performed specifically for the Project before products and materials are incorporated into the Work to verify performance or compliance with specified criteria.
- F. Product Testing: Tests and inspections that are performed by an NRTL, an NVLAP, or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with industry standards.
- G. Source Quality-Control Testing: Tests and inspections that are performed at the source, i.e., plant, mill, factory, or shop.
- H. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.
- I. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.
- J. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.
 - 1. Using a term such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to tradespeople of the corresponding generic name.
- K. Experienced: When used with an entity, "experienced" means having successfully completed a minimum of Five (5) previous projects similar in size and scope to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

1.4 CONFLICTING REQUIREMENTS

- A. General: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer uncertainties and requirements that are different, but apparently equal, to Architect for a decision before proceeding.
- B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.

1.5 SUBMITTALS

- A. Qualification Data: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.
- B. Schedule of Tests and Inspections: Prepare in tabular form and include the following:
 - 1. Specification Section number and title.
 - 2. Description of test and inspection.
 - 3. Identification of applicable standards.
 - 4. Identification of test and inspection methods.
 - 5. Number of tests and inspections required.
 - 6. Time schedule or time span for tests and inspections.
 - 7. Entity responsible for performing tests and inspections.
 - 8. Requirements for obtaining samples.
 - 9. Unique characteristics of each quality-control service.
- C. Reports: Prepare and submit certified written reports that include the following:
 - 1. Date of issue.
 - 2. Project title and number.
 - 3. Name, address, and telephone number of testing agency.
 - 4. Dates and locations of samples and tests or inspections.
 - 5. Names of individuals making tests and inspections.
 - 6. Description of the Work and test and inspection method.
 - 7. Identification of product and Specification Section.
 - 8. Complete test or inspection data.
 - 9. Test and inspection results and an interpretation of test results.
 - 10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
 - 11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
 - 12. Name and signature of laboratory inspector.
 - 13. Recommendations on retesting and reinspecting.
- D. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

1.6 QUALITY ASSURANCE

- A. General: Qualifications paragraphs in this Article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.
- B. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.

- C. **Manufacturer Qualifications:** A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- D. **Fabricator Qualifications:** A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- E. **Specialists:** Certain sections of the Specifications require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.
 - 1. Requirement for specialists shall not supersede building codes and regulations governing the Work.
- F. **Factory-Authorized Service Representative Qualifications:** An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- G. **Preconstruction Testing:** Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:
 - 1. Contractor responsibilities include the following:
 - a. Provide test specimens representative of proposed products and construction.
 - b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
 - c. Provide sizes and configurations of test assemblies, mockups, and laboratory mockups to adequately demonstrate capability of products to comply with performance requirements.
 - d. Build site-assembled test assemblies and mockups using installers who will perform same tasks for Project.
 - e. Build laboratory mockups at testing facility using personnel, products, and methods of construction indicated for the completed Work.
 - f. When testing is complete, remove test specimens, assemblies, mockups, and laboratory mockups; do not reuse products on Project.
 - 2. **Testing Agency Responsibilities:** Submit a certified written report of each test, inspection, and similar quality-assurance service to Architect, through Owner, with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.
- H. **Mockups:** Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
 - 1. Build mockups in location and of size indicated or, if not indicated, as directed by Architect or Owner.

2. Notify Architect and owner Seven (7) days in advance of dates and times when mockups will be constructed.
 3. Demonstrate the proposed range of aesthetic effects and workmanship.
 4. Obtain Architect's and Owner's approval of mockups before starting work, fabrication, or construction.
 - a. Allow Seven (7) days for initial review and each re-review of each mockup.
 5. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
 6. Demolish and remove mockups when directed, unless otherwise indicated.
- I. Laboratory Mockups: Comply with requirements of preconstruction testing and those specified in individual Sections in Division 2.

1.7 QUALITY CONTROL

- A. Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
1. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.
 2. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
 3. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
 4. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
- B. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Division 1 Section "Submittal Procedures."
- C. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.
- D. Testing Agency Responsibilities: Cooperate with Architect, Owner, and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
1. Notify Architect, Owner, and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
 2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.
 3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.

4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
 5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
 6. Do not perform any duties of Contractor.
- E. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
1. Access to the Work.
 2. Incidental labor and facilities necessary to facilitate tests and inspections.
 3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
 4. Facilities for storage and field curing of test samples.
 5. Delivery of samples to testing agencies.
 6. Security and protection for samples and for testing and inspecting equipment at Project site.
- F. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
1. Schedule times for tests, inspections, obtaining samples, and similar activities.
- G. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents. Submit schedule within Thirty (30) days of date established for the Notice of Award.
1. Distribution: Distribute schedule to Owner and Architect, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

- A. Prepare a record of tests and inspections. Include the following:
1. Date test or inspection was conducted.
 2. Description of the Work tested or inspected.
 3. Date test or inspection results were transmitted to Architect.
 4. Identification of testing agency or special inspector conducting test or inspection.

- B. Maintain log at Project site. Post changes and modifications as they occur. Provide access to test and inspection log for Architect's and Owner's reference during normal working hours.

3.2 REPAIR AND PROTECTION

- A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
 - 1. Provide materials and comply with installation requirements specified in other Specification Sections. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible.
- B. Protect construction exposed by or for quality-control service activities.
- C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 01400

SECTION 01420 - REFERENCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 DEFINITIONS

- A. General: Basic Contract definitions are included in the Conditions of the Contract.
- B. "Approved": When used to convey Architect's action on Contractor's submittals, applications, and requests, "approved" is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.
- C. "Directed": A command or instruction by Architect. Other terms including "requested," "authorized," "selected," "approved," "required," and "permitted" have the same meaning as "directed."
- D. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."
- E. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.
- F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- G. "Install": Operations at Project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
- H. "Provide": Furnish and install, complete and ready for the intended use.
- I. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

1.3 INDUSTRY STANDARDS

- A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if

bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.

- B. **Publication Dates:** Comply with standards in effect as of date of the Contract Documents, unless otherwise indicated.
- C. **Copies of Standards:** Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.
- D. **Abbreviations and Acronyms for Standards and Regulations:** Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations in the following list. Names, telephone numbers, and Web-site addresses are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

ADAAG	Americans with Disabilities Act (ADA)	(800) 872-2253
	Architectural Barriers Act (ABA)	
	Accessibility Guidelines for Buildings and Facilities	(202) 272-0080
	Available from Access Board	
	www.access-board.gov	
CFR	Code of Federal Regulations	(888) 293-6498
	Available from Government Printing Office	(202) 512-1530
	www.gpoaccess.gov/cfr/index.html	
CRD	Handbook for Concrete and Cement	(601) 634-2355
	Available from Army Corps of Engineers	
	Waterways Experiment Station	
	www.wes.army.mil	
DOD	Department of Defense Military Specifications and Standards	(215) 697-6257
	Available from Department of Defense Single Stock Point	
	www.dodssp.daps.mil	
DSCC	Defense Supply Center Columbus (See FS)	
FED-STD	Federal Standard (See FS)	
FS	Federal Specification	(215) 697-

	Available from Department of Defense Single Stock Point www.dodssp.daps.mil	6257
	Available from General Services Administration www.fss.gsa.gov	(202) 501-1021
	Available from National Institute of Building Sciences www.nibs.org	(202) 289-7800
FTMS	Federal Test Method Standard (See FS)	
ICC-ES	ICC Evaluation Service, Inc. www.icc-es.org	(800) 423-6587 (562) 699-0543
MIL	(See MILSPEC)	
MIL-STD	(See MILSPEC)	
MILSPEC	Military Specification and Standards Available from Department of Defense Single Stock Point www.dodssp.daps.mil	(215) 697-6257
NES	(Formerly: National Evaluation Service) (See ICC-ES)	
UFAS	Uniform Federal Accessibility Standards Available from Access Board www.access-board.gov	(800) 872-2253 (202) 272-0080

1.4 ABBREVIATIONS AND ACRONYMS

- A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities indicated in Gale Research's "Encyclopedia of Associations" or in Columbia Books' "National Trade & Professional Associations of the U.S."
- B. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web-site addresses are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

AA	Aluminum Association, Inc. (The) www.aluminum.org	(202) 862-5100
AAADM	American Association of Automatic Door Manufacturers www.aaadm.com	(216) 241-7333
AABC	Associated Air Balance Council www.aabchq.com	(202) 737-0202
AAMA	American Architectural Manufacturers Association www.aamanet.org	(847) 303-5664
AASHTO	American Association of State Highway and Transportation Officials www.transportation.org	(202) 624-5800
AATCC	American Association of Textile Chemists and Colorists (The) www.aatcc.org	(919) 549-8141
ABMA	American Bearing Manufacturers Association www.abma-dc.org	(202) 367-1155
ACI	ACI International (American Concrete Institute) www.aci-int.org	(248) 848-3700
ACPA	American Concrete Pipe Association www.concrete-pipe.org	(972) 506-7216
AEIC	Association of Edison Illuminating Companies, Inc. (The) www.aeic.org	(205) 257-2530
AF&PA	American Forest & Paper Association www.afandpa.org	(800) 878-8878 (202) 463-2700
AGA	American Gas Association www.aga.org	(202) 824-7000
AGC	Associated General Contractors of America (The) www.agc.org	(703) 548-3118
AHA	American Hardboard Association (Now part of CPA)	
AHAM	Association of Home Appliance Manufacturers www.aham.org	(202) 872-5955
AI	Asphalt Institute www.asphaltinstitute.org	(859) 288-4960
AIA	American Institute of Architects (The)	(800) 242-3837

	www.aia.org	(202) 626-7300
AISC	American Institute of Steel Construction www.aisc.org	(800) 644-2400 (312) 670-2400
AISI	American Iron and Steel Institute www.steel.org	(202) 452-7100
AITC	American Institute of Timber Construction www.aitc-glulam.org	(303) 792-9559
ALCA	Associated Landscape Contractors of America www.alca.org	(800) 395-2522 (703) 736-9666
ALSC	American Lumber Standard Committee, Incorporated www.alsc.org	(301) 972-1700
AMCA	Air Movement and Control Association International, Inc. www.amca.org	(847) 394-0150
ANSI	American National Standards Institute www.ansi.org	(202) 293-8020
AOSA	Association of Official Seed Analysts www.aosaseed.com	(505) 522-1437
APA	APA - The Engineered Wood Association www.apawood.org	(253) 565-6600
APA	Architectural Precast Association www.archprecast.org	(239) 454-6989
API	American Petroleum Institute www.api.org	(202) 682-8000
ARI	Air-Conditioning & Refrigeration Institute www.ari.org	(703) 524-8800
ARMA	Asphalt Roofing Manufacturers Association www.asphaltroofing.org	(202) 207-0917
ASCE	American Society of Civil Engineers www.asce.org	(800) 548-2723 (703) 295-6300
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers www.ashrae.org	(800) 527-4723 (404) 636-8400
ASME	ASME International (The American Society of Mechanical Engineers International) www.asme.org	(800) 843-2763 (212) 591-7722

ASSE	American Society of Sanitary Engineering www.asse-plumbing.org	(440) 835-3040
ASTM	ASTM International (American Society for Testing and Materials International) www.astm.org	(610) 832-9585
AWCI	AWCI International (Association of the Wall and Ceiling Industries International) www.awci.org	(703) 534-8300
AWCMA	American Window Covering Manufacturers Association (Now WCSC)	
AWI	Architectural Woodwork Institute www.awinet.org	(800) 449-8811 (703) 733-0600
AWPA	American Wood-Preservers' Association www.awpa.com	(334) 874-9800
AWS	American Welding Society www.aws.org	(800) 443-9353 (305) 443-9353
AWWA	American Water Works Association www.awwa.org	(800) 926-7337 (303) 794-7711
BHMA	Builders Hardware Manufacturers Association www.buildershardware.com	(212) 297-2122
BIA	Brick Industry Association (The) www.bia.org	(703) 620-0010
BICSI	BICSI www.bicsi.org	(813) 979-1991
BIFMA	BIFMA International (Business and Institutional Furniture Manufacturer's Association International) www.bifma.com	(616) 285-3963
BISSC	Baking Industry Sanitation Standards Committee www.bissc.org	(773) 761-4100
	Cast Stone Institute www.caststone.org	(770) 972-3011
CCC	Carpet Cushion Council www.carpetcushion.org	(203) 637-1312
CDA	Copper Development Association Inc.	(800) 232-3282

	www.copper.org	(212) 251-7200
CEA	Canadian Electricity Association www.canelect.ca/connections_online/home.htm	(613) 230-9263
CFFA	Chemical Fabrics & Film Association, Inc. www.chemicalfabricsandfilm.com	(216) 241-7333
CGA	Compressed Gas Association www.cganet.com	(703) 788-2700
CGSB	Canadian General Standards Board w3.pwgsc.gc.ca/cgsb	(800) 665-2472 (819) 956-0425
CIMA	Cellulose Insulation Manufacturers Association www.cellulose.org	(888) 881-2462 (937) 222-2462
CISCA	Ceilings & Interior Systems Construction Association www.cisca.org	(630) 584-1919
CISPI	Cast Iron Soil Pipe Institute www.cispi.org	(423) 892-0137
CLFMI	Chain Link Fence Manufacturers Institute www.chainlinkinfo.org	(301) 596-2583
CPA	Composite Panel Association www.pbmdf.com	(301) 670-0604
CPPA	Corrugated Polyethylene Pipe Association www.cppa-info.org	(800) 510-2772 (202) 462-9607
CRI	Carpet & Rug Institute (The) www.carpet-rug.com	(800) 882-8846 (706) 278-3176
CRSI	Concrete Reinforcing Steel Institute www.crsi.org	(847) 517-1200
CSA	CSA International (Formerly: IAS - International Approval Services) www.csa-international.org	(800) 463-6727 (416) 747-4000
CSI	Construction Specifications Institute (The) www.csinet.org	(800) 689-2900 (703) 684-0300
CSSB	Cedar Shake & Shingle Bureau www.cedarbureau.org	(604) 820-7700
CTI	Cooling Technology Institute (Formerly: Cooling Tower Institute) www.cti.org	(281) 583-4087

DHI	Door and Hardware Institute www.dhi.org	(703) 222-2010
EIA	Electronic Industries Alliance www.eia.org	(703) 907-7500
EIMA	EIFS Industry Members Association www.eima.com	(800) 294-3462 (770) 968-7945
EJCDC	Engineers Joint Contract Documents Committee www.asce.org	(800) 548-2723 (703) 295-6300
EJMA	Expansion Joint Manufacturers Association, Inc. www.ejma.org	(914) 332-0040
ESD	ESD Association www.esda.org	(315) 339-6937
FCI	Fluid Controls Institute www.fluidcontrolsintitute.org	(216) 241-7333
FIBA	Federation Internationale de Basketball Amateur (The International Basketball Federation) www.fiba.com	41 22 545 00 00
FIVB	Federation Internationale de Volleyball (The International Volleyball Federation) www.fivb.ch	41 21 345 35 35
FM	Factory Mutual System (Now FMG)	
FMG	FM Global (Formerly: FM - Factory Mutual System) www.fmglobal.com	(401) 275-3000
FRSA	Florida Roofing, Sheet Metal & Air Conditioning Contractors Association, Inc. www.floridarroof.com	(407) 671-3772
FSA	Fluid Sealing Association www.fluidsealing.com	(610) 971-4850
FSC	Forest Stewardship Council www.fsc.org	52 951 5146905
GA	Gypsum Association www.gypsum.org	(202) 289-5440
GANA	Glass Association of North America	(785) 271-0208

	www.glasswebsite.com	
GRI	(Now GSI)	
GS	Green Seal www.greenseal.org	(202) 872-6400
GSI	Geosynthetic Institute www.geosynthetic-institute.org	(610) 522-8440
HI	Hydraulic Institute www.pumps.org	(888) 786-7744 (973) 267-9700
HI	Hydronics Institute www.gamanet.org	(908) 464-8200
HMMA	Hollow Metal Manufacturers Association (Part of NAAMM)	
HPVA	Hardwood Plywood & Veneer Association www.hpva.org	(703) 435-2900
HPW	H. P. White Laboratory, Inc. www.hpwhite.com	(410) 838-6550
IAS	International Approval Services (Now CSA International)	
IBF	International Badminton Federation www.intbadfed.org	441-24 223- 4904
ICEA	Insulated Cable Engineers Association, Inc. www.icea.net	(770) 830-0369
ICRI	International Concrete Repair Institute, Inc. www.icri.org	(847) 827-0830
IEC	International Electrotechnical Commission www.iec.ch	41 22 919 02 11
IEEE	Institute of Electrical and Electronics Engineers, Inc. (The) www.ieee.org	(212) 419-7900
IESNA	Illuminating Engineering Society of North America www.iesna.org	(212) 248-5000
IGCC	Insulating Glass Certification Council www.igcc.org	(315) 646-2234
IGMA	Insulating Glass Manufacturers Alliance (The)	(613) 233-1510

	www.igmaonline.org	
ILI	Indiana Limestone Institute of America, Inc. www.iliai.com	(812) 275-4426
ISO	International Organization for Standardization www.iso.ch	41 22 749 01 11
ISSFA	International Solid Surface Fabricators Association www.issfa.net	(702) 567-8150
ITS	Intertek www.intertek.com	(800) 345-3851 (607) 753-6711
ITU	International Telecommunication Union www.itu.int/home	41 22 730 51 11
KCMA	Kitchen Cabinet Manufacturers Association www.kcma.org	(703) 264-1690
LMA	Laminating Materials Association (Now part of CPA)	
LPI	Lightning Protection Institute www.lightning.org	(800) 488-6864 (847) 577-7200
MBMA	Metal Building Manufacturers Association www.mbma.com	(216) 241-7333
MFMA	Maple Flooring Manufacturers Association www.maplefloor.org	(847) 480-9138
MFMA	Metal Framing Manufacturers Association www.metalframingmfg.org	(312) 644-6610
MH	Material Handling (Now MHIA)	
MHIA	Material Handling Industry of America www.mhia.org	(800) 345-1815 (704) 676-1190
MIA	Marble Institute of America www.marble-institute.com	(440) 250-9222
MPI	Master Painters Institute www.paintinfo.com	(888) 674-8937
MSS	Manufacturers Standardization Society of The Valve and Fittings Industry Inc. www.mss-hq.com	(703) 281-6613

NAAMM	National Association of Architectural Metal Manufacturers www.naamm.org	(312) 332-0405
NACE	NACE International (National Association of Corrosion Engineers International) www.nace.org	(281) 228-6200
NADCA	National Air Duct Cleaners Association www.nadca.com	(202) 737-2926
NAGWS	National Association for Girls and Women in Sport www.aahperd.org/nagws/	(800) 213-7193, ext. 453
NAIMA	North American Insulation Manufacturers Association (The) www.naima.org	(703) 684-0084
NBGQA	National Building Granite Quarries Association, Inc. www.nbgqa.com	(800) 557-2848
NCAA	National Collegiate Athletic Association (The) www.ncaa.org	(317) 917-6222
NCMA	National Concrete Masonry Association www.ncma.org	(703) 713-1900
NCPI	National Clay Pipe Institute www.ncpi.org	(262) 248-9094
NCTA	National Cable & Telecommunications Association www.ncta.com	(202) 775-3550
NEBB	National Environmental Balancing Bureau www.nebb.org	(301) 977-3698
NECA	National Electrical Contractors Association www.necanet.org	(301) 657-3110
NeLMA	Northeastern Lumber Manufacturers' Association www.nelma.org	(207) 829-6901
NEMA	National Electrical Manufacturers Association www.nema.org	(703) 841-3200
NETA	InterNational Electrical Testing Association www.netaworld.org	(303) 697-8441
NFHS	National Federation of State High School Associations www.nfhs.org	(317) 972-6900
NFPA	NFPA	(800) 344-3555

	(National Fire Protection Association) www.nfpa.org	(617) 770-3000
NFRC	National Fenestration Rating Council www.nfrc.org	(301) 589-1776
NGA	National Glass Association www.glass.org	(703) 442-4890
NHLA	National Hardwood Lumber Association www.natlhardwood.org	(800) 933-0318 (901) 377-1818
NLGA	National Lumber Grades Authority www.nlga.org	(604) 524-2393
NOFMA	National Oak Flooring Manufacturers Association www.nofma.org	(901) 526-5016
NRCA	National Roofing Contractors Association www.nrca.net	(800) 323-9545 (847) 299-9070
NRMCA	National Ready Mixed Concrete Association www.nrmca.org	(888) 846-7622 (301) 587-1400
NSF	NSF International (National Sanitation Foundation International) www.nsf.org	(800) 673-6275 (734) 769-8010
NSSGA	National Stone, Sand & Gravel Association www.nssga.org	(800) 342-1415 (703) 525-8788
NTMA	National Terrazzo & Mosaic Association, Inc. www.ntma.com	(800) 323-9736 (540) 751-0930
NTRMA	National Tile Roofing Manufacturers Association (Now TRI)	
NWWDA	National Wood Window and Door Association (Now WDMA)	
OPL	Omega Point Laboratories, Inc. www.opl.com	(800) 966-5253 (210) 635-8100
PCI	Precast/Prestressed Concrete Institute www.pci.org	(312) 786-0300
PDCA	Painting & Decorating Contractors of America www.pdca.com	(800) 332-7322 (314) 514-7322
PDI	Plumbing & Drainage Institute www.pdionline.org	(800) 589-8956 (978) 557-0720

PGI	PVC Geomembrane Institute http://pgi-tp.ce.uiuc.edu	(217) 333-3929
PTI	Post-Tensioning Institute www.post-tensioning.org	(602) 870-7540
RCSC	Research Council on Structural Connections www.boltcouncil.org	(800) 644-2400 (312) 670-2400
RFCI	Resilient Floor Covering Institute www.rfci.com	(301) 340-8580
RIS	Redwood Inspection Service www.calredwood.org	(888) 225-7339 (415) 382-0662
RTI	(Formerly: NTRMA - National Tile Roofing Manufacturers Association) (Now TRI)	
SAE	SAE International www.sae.org	(724) 776-4841
SDI	Steel Deck Institute www.sdi.org	(847) 462-1930
SDI	Steel Door Institute www.steeldoor.org	(440) 899-0010
SEFA	Scientific Equipment and Furniture Association www.sefalabs.com	(516) 294-5424
SEI	Structural Engineering Institute www.seinstitute.com	(800) 548-2723 (703) 295-6195
SGCC	Safety Glazing Certification Council www.sgcc.org	(315) 646-2234
SIA	Security Industry Association www.siaonline.org	(703) 683-2075
SIGMA	Sealed Insulating Glass Manufacturers Association (Now IGMA)	
SJI	Steel Joist Institute www.steeljoist.org	(843) 626-1995
SMA	Screen Manufacturers Association www.smacentral.org	(561) 533-0991
SMACNA	Sheet Metal and Air Conditioning Contractors'	(703) 803-2980

	National Association www.smacna.org	
SMPTE	Society of Motion Picture and Television Engineers www.smpte.org	(914) 761-1100
SPFA	Spray Polyurethane Foam Alliance (Formerly: SPI/SPFD - The Society of the Plastics Industry, Inc.; Spray Polyurethane Foam Division) www.sprayfoam.org	(800) 523-6154
SPIB	Southern Pine Inspection Bureau (The) www.spib.org	(850) 434-2611
SPI/SPFD	Society of the Plastics Industry, Inc. (The) Spray Polyurethane Foam Division (Now SPFA)	
SPRI	SPRI (Single Ply Roofing Institute) www.spri.org	(781) 647-7026
SSINA	Specialty Steel Industry of North America www.ssina.com	(800) 982-0355 (202) 342-8630
SSPC	SSPC: The Society for Protective Coatings www.sspc.org	(877) 281-7772 (412) 281-2331
STI	Steel Tank Institute www.steeltank.com	(847) 438-8265
SWI	Steel Window Institute www.steelwindows.com	(216) 241-7333
SWRI	Sealant, Waterproofing, & Restoration Institute www.swrionline.org	(816) 472-7974
TCA	Tile Council of America, Inc. www.tileusa.com	(864) 646-8453
TIA/EIA	Telecommunications Industry Association/Electronic Industries Alliance www.tiaonline.org	(703) 907-7700
TMS	The Masonry Society www.masonrysociety.org	(303) 939-9700
TPI	Truss Plate Institute, Inc. www.tpinst.org	(608) 833-5900
TPI	Turfgrass Producers International	(800) 405-8873

	www.turfgrassod.org	(847) 705-9898
TRI	Tile Roofing Institute (Formerly: RTI - Roof Tile Institute) www.tilerroofing.org	(312) 670-4177
UL	Underwriters Laboratories Inc. www.ul.com	(800) 285-4476 (847) 272-8800
UNI	Uni-Bell PVC Pipe Association www.uni-bell.org	(972) 243-3902
USAV	USA Volleyball www.usavolleyball.org	(888) 786-5539 (719) 228-6800
USGBC	U.S. Green Building Council www.usgbc.org	(202) 828-7422
USITT	United States Institute for Theatre Technology, Inc. www.usitt.org	(800) 938-7488 (315) 463-6463
WASTEC	Waste Equipment Technology Association www.wastec.org	(800) 424-2869 (202) 244-4700
WCLIB	West Coast Lumber Inspection Bureau www.wclib.org	(800) 283-1486 (503) 639-0651
WCMA	Window Covering Manufacturers Association (Now WCSC)	
WCSC	Window Covering Safety Council (Formerly: WCMA - Window Covering Manufacturers Association) www.windowcoverings.org	(800) 506-4636 (212) 661-4261
WDMA	Window & Door Manufacturers Association (Formerly: NWWDA - National Wood Window and Door Association) www.wdma.com	(800) 223-2301 (847) 299-5200
WI	Woodwork Institute (Formerly: WIC - Woodwork Institute of California) www.wicnet.org	(916) 372-9943
WIC	Woodwork Institute of California (Now WI)	
WMMPA	Wood Moulding & Millwork Producers Association www.wmmpa.com	(800) 550-7889 (530) 661-9591
WSRCA	Western States Roofing Contractors Association	(800) 725-0333

www.wsrca.com

(650) 548-0112

WWPA Western Wood Products Association
www.wwpa.org

(503) 224-3930

C. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web-site addresses are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

BOCA BOCA International, Inc.
(See ICC)

CABO Council of American Building Officials
(See ICC)

IAPMO International Association of Plumbing and Mechanical Officials
www.iapmo.org

(909) 472-4100

ICBO International Conference of Building Officials
(See ICC)

ICBO ES ICBO Evaluation Service, Inc.
(See ICC-ES)

ICC International Code Council
(Formerly: CABO - Council of American Building Officials)
www.iccsafe.org

(703) 931-4533

ICC-ES ICC Evaluation Service, Inc.
www.icc-es.org

(800) 423-6587
(562) 699-0543

NES National Evaluation Service
(See ICC-ES)

SBCCI Southern Building Code Congress International, Inc.
(See ICC)

D. Federal Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web-site addresses are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

CE Army Corps of Engineers
www.usace.army.mil

CPSC Consumer Product Safety Commission

(800) 638-2772

	www.cpsc.gov	(301) 504-6816
DOC	Department of Commerce www.commerce.gov	(202) 482-2000
DOD	Department of Defense www.dodssp.daps.mil	(215) 697-6257
DOE	Department of Energy www.eren.doe.gov	(202) 586-9220
EPA	Environmental Protection Agency www.epa.gov	(202) 272-0167
FAA	Federal Aviation Administration www.faa.gov	(202) 366-4000
FCC	Federal Communications Commission www.fcc.gov	(888) 225-5322
FDA	Food and Drug Administration www.fda.gov	(888) 463-6332
GSA	General Services Administration www.gsa.gov	(800) 488-3111 (202) 501-1888
HUD	Department of Housing and Urban Development www.hud.gov	(202) 708-1112
LBL	Lawrence Berkeley National Laboratory www.lbl.gov	(510) 486-4000
NCHRP	National Cooperative Highway Research Program (See TRB)	
NIST	National Institute of Standards and Technology www.nist.gov	(301) 975-6478
OSHA	Occupational Safety & Health Administration www.osha.gov	(800) 321-6742 (202) 693-1999
PBS	Public Building Service (See GSA)	
PHS	Office of Public Health and Science http://phs.os.dhhs.gov	(202) 690-7694
RUS	Rural Utilities Service (See USDA)	(202) 720-9540
SD	State Department	(202) 647-4000

www.state.gov

TRB	Transportation Research Board www.nas.edu/trb	(202) 334-2934
USDA	Department of Agriculture www.usda.gov	(202) 720-2791
USPS	Postal Service www.usps.com	(202) 268-2000

- E. State Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web-site addresses are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

CBHF	State of California, Department of Consumer Affairs Bureau of Home Furnishings and Thermal Insulation www.dca.ca.gov/bhfti	(800) 952-5210 (916) 574-2041
CPUC	California Public Utilities Commission www.cpuc.ca.gov	(415) 703-2782
TFS	Texas Forest Service Forest Products Laboratory http://txforestservicetamu.edu	(936) 639-8180

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01420

SECTION 01500 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes requirements for temporary utilities, support facilities, and security and protection facilities.
- B. Related Sections include the following:
 - 1. Division 1 Section "Submittal Procedures" for procedures for submitting copies of implementation and termination schedule and utility reports.

1.3 DEFINITIONS

- A. Permanent Enclosure: As determined by Architect, permanent or temporary roofing is complete, insulated, and weathertight; exterior walls are insulated and weathertight; and all openings are closed with permanent construction or substantial temporary closures.

1.4 USE CHARGES

- A. General: Cost or use charges for temporary facilities shall be included in the Contract Sum.
- B. Water Service: Water from Owner's existing water system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.
- C. Electric Power Service: Electric power from Owner's existing system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.

1.5 SUBMITTALS

- A. Site Plan: Show temporary facilities, utility hookups, staging areas, and parking areas for construction personnel.

PART 2 - PRODUCTS

2.1 MATERIALS – NOT USED

2.2 TEMPORARY FACILITIES

- A. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.
 - 1. Store combustible materials apart from building.

2.3 EQUIPMENT

- A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.
- B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.2 TEMPORARY UTILITY INSTALLATION

- A. General: Install temporary service or connect to existing service.
- B. Water Service: Use of Owner's existing water service facilities will be permitted, as long as facilities are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.
 - 1. Where installations below an outlet might be damaged by spillage or leakage, provide a drip pan of suitable size to minimize water damage. Drain accumulated water promptly from pans.
- C. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.
- D. Electric Power Service: Use of Owner's existing electric power service will be permitted, as long as equipment is maintained in a condition acceptable to Owner.

1. Provide superintendent with cellular telephone or portable two-way radio for use when away from project site.

3.3 SUPPORT FACILITIES INSTALLATION

- A. Waste Disposal Facilities: Comply with requirements specified in Division 1 Section "Construction Waste Management."
- B. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction.
- C. Tree and Plant Protection: Comply with requirements specified in Division 2 Sections "Trees", and "Landscape Maintenance Period for Trees".
- D. Tree and Plant Protection: Install temporary fencing located as indicated or outside the drip line of trees to protect vegetation from damage from construction operations. Protect tree root systems from damage, flooding, and erosion.

3.4 OPERATION, TERMINATION, AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
- B. Maintenance: Maintain facilities in good operating condition until removal.
- C. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
 1. Materials and facilities that constitute temporary facilities are property of Contractor.
 2. At Substantial Completion, clean and renovate permanent facilities used during construction period. Comply with final cleaning requirements specified in Division 1 Section "Closeout Procedures."

END OF SECTION 01500

SECTION 01505 – CONSTRUCTION WASTE MANAGEMENT

PART 1 GENERAL

1.1. GENERAL REQUIREMENTS

- 1.1.1. Work of this Section shall conform to the requirements of the General Conditions of the Contract, Division 1 and any Addenda.

1.2. REQUIREMENTS OF THIS SECTION

- 1.2.1. Waste Management Requirements;
- 1.2.2. Waste Management Plan;
- 1.2.3. Progress Reports;
- 1.2.4. Project Meetings;
- 1.2.5. Management Plan Implementation.

1.3. WASTE MANAGEMENT REQUIREMENTS

- 1.3.1. The Owner has established that this Project shall generate the least amount of waste possible and that processes that ensure the generation of as little waste as possible due to error, inaccurate planning, breakage, mishandling, contamination, or other factors shall be employed.
- 1.3.2. Of the inevitable waste that is generated, as many of the waste materials as economically feasible, and as stated here, shall be reused, salvaged, or recycled. Waste disposal in landfills shall be minimized.
- 1.3.3. The Owner's environmental goals for this Project include compliance with the *Sustainable Design Guidelines for WTC Redevelopment Projects* and achieving LEED (Leadership in Energy and Environmental Design) certification, with a projected rating of Silver, from the U.S. Green Building Council. The documentation required in this Section will be used to meet these goals.

Compliance

- 1.3.4. Diversion Requirements: A minimum 50% (with a target of 75%) of total Project demolition and construction waste (by weight) shall be diverted from landfill. The following waste categories are likely candidates to be included in the diversion plan for this project:
 - 1. Packaging
 - a) Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.
 - b) Polystyrene Packaging: Separate and bag materials.

- c) Pallets: As much as possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.
 - d) Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.
 - e) Tree box material: Break down wooden tree box material into component wood pieces and comply with requirements for recycling wood.
 - f) Site-Clearing Wastes: Chip brush, branches, and trees.
 - g) Comply with requirements in Division 2 Section "Trees" and "Landscape Maintenance Period for Trees" for use of chipped organic waste as organic mulch.
 - h) Wood Materials:
 - 1.3.4.1.h.1. Clean Cut-Offs of Lumber: Grind or chip into small pieces.
 - 1.3.4.1.h.2. Clean Sawdust: Bag sawdust that does not contain painted or treated wood.
 - i) Metals: (e.g. banding, piping, rebar, steel, iron, galvanized, stainless steel, aluminum, copper, zinc, brass, bronze);
 - j) Mercury: Fluorescent lamps, HID lamps and mercury-containing thermostats removed from the Site shall be recycled to the maximum extent feasible, and in accordance with applicable codes and regulations.
- 1.3.5. Due to the nature and location of the Site, sorting and recycling of waste on Site will not be allowed, unless otherwise noted. Contractor and vendor to include off site opportunities to recycle and reuse removed material in the Waste Management Plan.

1.4. DEFINITIONS

- 1.4.1. Clean: Untreated and unpainted; not contaminated with oils, solvents, caulk or the like.
- 1.4.2. Construction and Demolition Waste: Solid wastes typically including building materials, packaging, trash debris and rubble resulting from construction, remodeling repair and demolition operations. Hazardous Materials are not included.
- 1.4.3. Diversion from Landfill: To remove, or have removed, from the Site for recycling, reuse or salvage, material that might otherwise be sent to a landfill. Diversion from landfill does not include using the material as alternative daily cover at a landfill site, nor does it include burning, incinerating or thermally destroying waste.
- 1.4.4. Plan: The combined elements of each contractor/vendors Waste Management Plan when combined with the overall program of waste removal and recycling of material from the Site.

- 1.4.5. Recyclable: The ability of a product or material to be recovered at the end of its life cycle and remanufactured into a new product.
- 1.4.6. Recycle (recycling): To sort, separate, process, treat or reconstitute solid waste and other discarded materials for the purpose of redirecting such materials into the manufacture of useful products. Recycling does not include burning, incinerating or thermally destroying waste.
- 1.4.7. Return: To give back reusable items or unused products to vendors.
- 1.4.8. Reuse: To reuse excess or discarded construction material in some manner on the Site.
- 1.4.9. Salvage: To remove a waste material from the Site for resale or reuse.
- 1.4.10. Waste: Extra material or material that has reached the end of its useful life in its intended use. Waste includes salvageable, returnable, recyclable and reusable material.
- 1.4.11. Waste Management Plan: The Contractor shall prepare a project-specific Plan for the collection, transportation and disposal of waste generated at the Site. The purpose of the Plan is to ultimately reduce the amount of material becoming landfill. In addition, trade subcontractors will be required to prepare individual Waste Management Plans relating to their scope of work. The Contractor shall incorporate these individual Plans into the overall Waste Management Plan for the Project, which shall be approved by the Owner and Architect prior to the commencement of work.

Each contractor/vendor is to prepare project-related plan

- 1.5. REFERENCES, RESOURCES
 - 1.5.1. The Owner encourages its contractors to seek information from websites and experts in salvage or recycling in order to minimize disposal costs. There are numerous opportunities to sell salvage, or to donate salvage and accrue tax benefits (which might accrue to the Contractor); also there are outlets that will pick up, and in some cases buy recyclable materials. Examples of information resources are as follows:
 - 1.5.2. Outlets: For assistance in finding outlets for specific materials on specific projects, one (1) possible source is New York WasteMatch. Email: wastematch@itac.org
Telephone: 212-442-5219
 - 1.5.3. New York City Department of Design and Construction (DDC) Sustainable Design web site: www.nyc.gov/ddcgreen This includes a manual on Construction and Demolition Waste Reduction and Recycling, a Sample Waste Management Plan and a list of internet resources.
 - 1.5.4. Directory of Construction and Demolition Waste Processors. A list of local recycling processors is available from DDC's Office of Sustainable Design. This list is provided for information only and is not necessarily comprehensive; other haulers and markets are acceptable

- 1.5.5. Web Resources (Information only; no warranty or endorsement is implied.)
www.wastematch.org Site of New York Waste Match, a materials exchange database and service
www.usgbc.org Site of the United States Green Building Council, with a description of the LEED certification process and requirements for C&D waste recycling
www.epa.gov/epaoswer/non-hw/debris/ Site of the U.S. Environmental Protection Agency that discusses construction and demolition waste issues, and links to other resources.

1.6. SUBMITTALS

- 1.6.1. The Contractor shall be responsible for the development and implementation of an overall Project Construction Waste Management Plan, in accordance with the goals and requirements set forth in this Section.

- 1.6.2. Construction Waste Management Plan: within fourteen (14) days after Notice to Proceed, or prior to waste removal (whichever occurs sooner) the Contractor shall submit Five (5) copies of a Construction Waste Management Plan to the Owner and Architect for approval. The Plan shall contain at a minimum the following:

1. An analysis of the materials to be used to crate, protect, transport equipment and materials to the Site. The analysis to include methods to avoid, reuse, recycle, return and in general minimize the amount of waste that will be generated by this contractors work.
2. Contractor to meet with their vendors and suppliers to explore opportunities to minimize transportation, excess handling, excess packaging and use of non-environmentally responsible practices. Submit documentation of this process.
3. Estimate of the total proposed Site waste to be generated, including types and quantities.
4. Proposed alternatives to Land-filling: A list of each material proposed to be salvaged, reused, or recycled during the course of the Project, the proposed destination for each material, and the projected amount by weight.
5. Materials handling procedures. A description of the means by which waste materials identified above for salvage, reuse, or recycling will be protected from contamination, and a description of the means to be employed in recycling the above materials consistent with the requirements for acceptance by recycling processors to be utilized.
6. List of documentation to be provided in Progress Reports.
7. Identification of how this Plan will be documented on a monthly basis.

1.7. PROGRESS REPORTS –WASTE MANAGEMENT

- 1.7.1. Contractor shall submit monthly a Waste Management Progress Report, containing the following information: Project title, name of company completing report, and dates of period covered by the report

- 1.7.2. Report on the disposal of site waste, including:
1. Recycled materials. For each material, provide the following:
 - a) Amount (in tons);
 - b) Dates removed from the Site;
 - c) Receiving Party.
 2. Reused or salvaged materials. For each material, provide the following:
 - a) Amount (in tons);
 - b) Description of intended or actual use.
 - c) Receiving Party
 3. Land filled materials. Provide the following:
 - a) Amount (in tons);
 - b) Dates removed from the Site;
 - c) Identity of the transfer station or landfill.
- 1.7.3. Include legible copies of on-site logs, weight tickets and receipts. Receipts shall be from recycling and/or disposal site operators who can legally accept the materials for the purpose of reuse, recycling or disposal. If mixed construction and demolition waste is sorted off-site, provide a letter from the processor stating the average percentage of mixed construction and demolition waste they recycle. Contractor shall save such original documents (as above) for the life of the Project plus three (3) year(s).

PART 2 – PRODUCTS (Not used)

PART 3 – EXECUTION (Not used).

END OF SECTION 01505

SECTION 01540 - SAFE AND HEALTHFUL WORKING CONDITIONS

PART 1 – GENERAL

1.01 DESCRIPTION OF WORK

- A. The work under this Section includes the preparation and implementation of a safety program at the Project Site designed to maintain working conditions that shall be as safe and healthful as the nature of that operation permits and to comply with requirements of all applicable Federal, State and local rules, codes and regulations.

1.02 RELATED SECTIONS – NOT USED

1.03 REFERENCES

- A. All application rules, codes and regulations of the United State Environmental Protection Agency.
- B. All applicable rules, codes and regulations of the Federal Occupational Safety and Health Act (1970).
- C. All applicable rules, codes and regulations of the New York State Department of Environmental Conservation.
- D. All applicable rules, codes and regulations of the New York City Department of Environmental Protection.
- E. All applicable rules, codes and regulations of the New York State Department of Health.
- F. All applicable rules, codes and regulations of the New York State Department of Labor.

1.04 DEFINITIONS

- A. Safety staff shall mean the safety professional and his/her safety representative(s).
- B. Competent person means one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous or dangerous to employees, and who has authority to take prompt corrective measures to eliminate them.

1.05 GENERAL REQUIREMENTS

- A. In prosecuting the Work, the Contractor shall provide working conditions for each operation that shall be as safe and healthful as the nature of that operation permits. The various operations connected with the Work shall be conducted so that they will not be unsafe or injurious to health, and the Contractor shall comply with all regulations and published recommendations of the New York State Department of Labor and all provisions, regulations and recommendations issued pursuant to the Federal Occupational Safety and Health Act of 1970 and the Construction Safety Act of 1969, as amended, and with laws, rules, and regulations of other authorities having jurisdiction, with regard to all matters relating to safe and healthful working conditions. Compliance with governmental

requirements is mandated by law and considered only a minimum level of safety performance. All work shall also be performed in accordance with safe work practices.

- B. The Contractor shall be responsible for the safety of the Contractor's employees, the public and all other persons at or about the Project Site. The Contractor shall be solely responsible for the adequacy and safety of all construction methods, materials, equipment and the safe prosecution of the Work.
- C. The Contractor shall employ a properly qualified safety professional familiar with all work under this contract whose duties shall be to initiate, review and cause implementation of measures for the protection of health and prevention of accidents. The Contractor shall also employ safety representative(s) whose duties shall be to work under the direct supervision of the safety professional to implement the safety program for the Work.
- D. The Contractor shall have a written site-specific Health and Safety Plan (SSHASP) prepared in accordance with OSHA Regulation 29 CFR Part 1910.120, and signed and sealed by a safety professional. The SSHASP shall contain a Task Hazard Analysis (THA) for each task. The Contractor shall have a safety professional and/or his/her trained safety representative(s) active on the Project Site at all times while the Work is in progress, shall have a documented safety training program, and shall have a safety work method checklist system.
- E. The safety staff shall be provided with an appropriate office on the Project Site to maintain and keep available safety records, up-to-date copies of all pertinent safety rules, codes, regulations and governing legislation, material safety data sheets, and the Project Site-specific SHASP including information concerning foreseeable emergency conditions, and location of emergency and telephone contacts for supportive actions.
- F. The Contractor shall stop the Work whenever a work procedure or a condition at the Project Site is deemed unsafe by the safety staff.

1.06 SUBMITTALS

- A. The responsible safety professional shall commit to writing the Contractor's SSHASP before the start of any construction. The Contractor shall submit Four (4) copies of the SSHASP to the Owner. The SSHASP shall be submitted to the Owner for review and comment at least Three (3) weeks before the beginning of any fieldwork. The Owner's comments shall be addressed by the Contractor and the SHASP resubmitted for review and comment within Two (2) working days of receipt of the Owner's written comments. This process shall be repeated until the Owner's comments are satisfactorily addressed.
- B. Within Fourteen (14) days of receiving the Notice of Award, the Contractor shall submit the name and resume of a safety professional, employed by the Contractor, who will be responsible for project safety management for the Project and the names and resume of the safety representative(s) who will work under the safety professional's direction.
- C. Resumes, along with other qualifications, of the safety professional and the safety representative(s), must be submitted to the Owner for review and approval. Each resume shall include such items as: experience, education and training; special safety courses completed; safety conferences attended; and certifications and registrations.

Documentation and/or personal references confirming the qualifications should also be provided. The Owner may reject persons proposed as safety professional or safety representative(s) for failure to have adequate qualifications or other cause.

1.07 QUALIFICATIONS OF SAFETY PROFESSIONAL AND SAFETY REPRESENTATIVE(S)

- A. Safety Professional: Qualifications of the safety professional shall be based on a minimum of: (1) Certification as a Certified Safety Professional granted by the Board of Certified Safety Professionals and 5 years of documented professional safety and health management experience, or (2) certification as a Certified Industrial Hygienist granted by American Board of Industrial Hygiene and 5 years of documented professional safety and health management experience, or (3) a Bachelor of Science degree in safety, industrial hygiene, occupational safety and health, or environmental health and science and 10 years of documented professional safety and health management experience. All documented professional safety and health management experience must be in the types of construction and conditions expected to be encountered for the Project. In addition, the safety professional shall be certified by the New York State Department of Labor as a workplace safety and loss prevention consultant pursuant to 12 NYCRR Section 59-1.12. All safety professionals must have successfully completed a 30-hour OSHA Construction Safety and Health training course, 40-hour OSHA Hazardous Waste Operations and Emergency Response training course and Confined Space training course.

The safety professional shall be completely experienced with and knowledgeable of all applicable health and safety requirements of all governing laws, rules, codes and regulations as well as of good safety practice and shall ensure compliance with them.

- B. Safety Representative(s): Qualifications of the safety representative(s) shall include a minimum of: 10 years of relevant construction experience (2 years of which were in construction safety management); and successful completion of a 30-hour OSHA Construction Safety and Health training course, 40-hour OSHA Hazardous Waste Operations and Emergency Response training course, and Confined Space training course.

PART 2 – PRODUCTS

2.01 SITE-SPECIFIC HEALTH AND SAFETY PLAN

- A. Acceptance of the SSHASP by the Owner will not impose on the Owner the responsibility for the Contractor's health and safety program nor will it relieve the Contractor from any of his/her safety responsibilities.
- B. The Owner will monitor the implementation of the SSHASP and report any violations by the Contractor. The Owner will also provide Project-specific recommendations to ensure the health and safety of the Contractor, subcontractors, City of New York and other personnel and visitors at the Project Site in the course of specific operations to be undertaken under this Work. The Contractor will abide by these Project-specific health and safety requirements as directed by the Owner.
- C. The provisions of the SSHASP and the presence and activities of the Owner at the Project Site in no way relieve the Contractor of his/her primary obligation to provide for the

safety of his/her employees and to ensure that all operations under the Contract Documents are carried out so as to protect persons and property at the Project Site and in the surrounding work area.

- D. These minimum health and safety requirements are based on the potential for physical, biological and chemical hazards associated with the work activities, including the potential exposure to known hazardous materials present within the site subsurface. The purpose of the SSHASP is to establish Project Site-specific health and safety requirements for protecting the health and safety of the Contractor, subcontractors, Owner, City of New York and other personnel and visitors at the Project Site during all activities conducted at the Project Site.
- E. The SSHASP shall include, as a minimum, the following items:
1. Identification of Key Health and Safety Personnel and Alternates
 - a. List key personnel and alternates for health and safety at the Project Site on a project responsibility chart which includes telephone numbers.
 - b. Identify roles and responsibilities of key health and safety personnel.
 2. Task Hazard Analyses
 - a. Identify and describe the work tasks required to complete the Work.
 - b. Provide a hazard assessment of each identified work task which shall include descriptions of potential physical, biological and chemical hazards associated with the performance of that work task.
 - c. Provide a description of health and safety mitigative actions for each project task which shall include, but not be limited to, administrative control, engineering control, safe work practice controls and personal protective equipment.
 - d. Provide a description of all work activities which may require entry into confined spaces. All such work activities must be performed in accordance with OSHA Regulation Title 29 CFR Part 1910.146. Procedures for this work must be included in the SSHASP.
 - e. All work involving excavations must be performed in accordance with OSHA Regulation Title 29 CFR Part 1926, Subpart P. Procedures for this work must be included in the SSHASP.
 3. Personnel Training Requirements
 - a. Confirm that personnel are adequately trained to conduct their job responsibilities and handle the specific hazardous situations they may encounter during the Project.
 - b. Provide, as required by the SHASP, certification of personnel training and First Aid/Cardio-Pulmonary Resuscitation.

- c. Establish procedures and training for a Hazard Communication Program in accordance with OSHA Regulation Title 29 CFR 1910.1200.
 - d. Provide information regarding training and experience of the person who will oversee excavation activities (i.e., the “competent person”).
 - e. Provide training, as required, in accordance with the requirements of OSHA Regulation Title 29 CFR Part 1910.120 including, but not limited to, initial training, refresher training, and management and supervisor training.
4. Personal Protective Equipment (PPE) and Respiratory Protection Programs
- a. Describe the protective clothing and equipment to be worn by personnel during task-specific operations of the Project.
 - b. Describe the PPE reassessment program for the upgrading/downgrading of PPE levels associated with the task-specific operations of the Project.
 - c. Provide a written respiratory protection program and reassessment program which shall be implemented during task-specific operations. The written program must include the procedure for proper selection and use of respirators; and instructions on proper cleaning, storage and inspection of respirators.
 - d. Provide, as required, documentation that personnel have received qualitative or quantitative respirator fit tests.
5. Medical Surveillance
- a. Describe the program for medical monitoring for each task-specific activity. The medical surveillance program must comply with the requirements of OSHA Regulation Title 29 CFR Part 1910.120.
 - b. Confirm and provide documentation, as applicable, that all personnel assigned to the Project Site are active participants in good standing in a medical surveillance program.
 - c. Provide documentation, as applicable, that all personnel assigned to the Project Site have respiratory clearance.
6. Site Control Measures
- a. Define site control methods and site communications and include a site map delineating the control areas, if appropriate.
 - b. Delineate the work areas, including an Exclusion Zone, Contamination Reduction Zone and Support Zone, and describe the activities allowed in each zone.

7. Intentionally Omitted

8. Decontamination Program
 - a. Establish decontamination procedures for personnel and equipment.
 - b. The decontamination program shall include provisions for hand washing and sanitation facilities, and lunch/break areas; and a description of proper housekeeping practices.

9. Emergency Response/Contingency Plan
 - a. Describe instructions and procedures for evacuation of personnel.
 - b. Describe instructions and procedures for methods of reporting fires. If the Contractor will be conducting activities such as welding, hot cutting or burning, or if flammable materials such as paints, glues and solvents will be used, the Contractor shall provide a minimum of two Class ABC fire extinguishers (minimum 10 pounds each) in the immediate work area.
 - c. Describe instructions and procedures for medical emergencies including emergency notification and response procedures and a description of the route to the hospital.
 - d. The medical emergency contingency plan shall include provisions for a minimum of two first aid kits (each of which is a minimum 24-unit industrial first aid kit).
 - e. Describe procedures addressing emergencies, and equipment failures and barrier failures during work activities.

11. Surveillance Methods
 - a. Describe safety surveillance methods.
 - b. Provide schedules of both walk-through surveys and in-depth safety audits to be performed at the Project Site.

12. Safety Inspection Sheets
 - a. Provide safety inspection check-off sheets to be used on a regular basis in evaluating the work methods used at the Project Site.

PART 3 – EXECUTION

3.01 SAFETY STAFF DUTIES

- A. The safety professional must visit the Project Site prior to signing and sealing the SSHASP. The safety professional shall also visit and audit all work areas as frequently as necessary to the Project Site to ensure that the SSHASP is adequate and site operations are being conducted in compliance with the SSHASP (a minimum of once a week) and shall be available for consultation whenever necessary. After each visit, the safety professional shall prepare a summary report, acceptable to the Owner, detailing the findings. The summary report shall include those hazards and violations discovered during the visit to the Project Site. The summary report shall be submitted to the Owner within One (1) business day of the visit to the Project Site.
- B. A safety representative must be at the Project Site whenever the Work is in progress. When multiple work shifts are used or if work is being performed at several non-contiguous areas, more than one safety representative may be required.
- C. The safety professional and/or his/her safety representative(s) shall, as a minimum:
1. Schedule and conduct monthly safety meetings and safety training programs, as appropriate, as required by law, the SSHASP and good safety practice. A specific schedule of dates of these meetings and an outline of materials to be covered shall be provided in the SSHASP. The Owner shall be advised in advance of the time and place of such meetings, and shall be invited to attend the meetings. All workers shall be instructed on the recognition of hazards, observance of precautions, of the contents of the SSHASP, and the use of protective and emergency equipment.
 2. Determine that operators of specific equipment are qualified by training and/or experience before they are allowed to operate such equipment.
 3. Develop and implement emergency response procedures. Post the name, address, directions to and hours of operation of the nearest medical facility; name, address, directions to and hours of operation of nearby “backup” clinics and hospitals; and the telephone numbers of the appropriate ambulance service, and fire and police departments.
 4. Post all appropriate notices regarding safety and health regulations at locations which afford maximum exposure to all workers at the Project Site.
 5. Post appropriate instructions and warning signs in regard to all hazardous areas or conditions which cannot be eliminated. Identification of these areas shall be based on experience, on site surveillance, and severity of hazard. Such signs shall not be used in place of appropriate workplace controls.
 6. Ascertain by personal inspection that all safety rules and regulations are enforced. Make inspections at least once a work shift to ensure that all machines, tools and equipment are in a safe operating condition; and that all work areas are free of hazards. Take necessary and timely corrective actions to eliminate all unsafe acts and/or conditions, and submit to the Owner each day a copy of

his/her findings on the inspection check list report forms established in the SSHASP.

7. Submit to the Owner, copies of all safety inspection reports and citations from regulating agencies and insurance companies within 1 working day of receipt of such reports.
8. Provide appropriate orientation to employees, visitors and sub-contractors.
9. Perform all related tasks necessary to achieve the highest degree of safety that the nature of the work permits.

3.02 ACCIDENT REPORTS

- A. The Contractor shall promptly report to the Owner all accidents involving injury to personnel or damage to equipment and structures, investigate these accidents and prepare required reports and submit a monthly summary report of these accidents. The Contractor must submit a preliminary accident report to the Construction Owner by the end of the following day at the latest.
 1. The monthly summary report, due by the 10th day of the following month, shall include descriptions of corrective actions to reduce the probability of similar accidents.
 2. In addition, the Contractor shall furnish to the Owner a copy of all accident and health or safety hazard reports received from OSHA or any other government agency within One (1) day of receipt.
- B. The Contractor shall submit on or before the 10th day of the month, an audit report for the prior month including the safety training held, equipment logs described in Section 3.03, records of the condition of the work areas, safety records, accidents, OSHA recordable injuries and illnesses including incidence rates, and an evaluation of the SSHASP with any changes necessary. The safety professional and the Contractor shall sign this audit report. The Owner shall review these reports for Contractor's compliance with the safety provisions of the Contract Documents.

3.03 SAFETY AND RESCUE EQUIPMENT

- A. The Contractor shall have proper safety and rescue equipment, adequately maintained and readily available, for any foreseeable contingency. This equipment may include, but not be limited to, such applicable items as: proper fire extinguishers, first aid supplies, safety ropes and harnesses, stretchers, water safety devices, oxygen breathing apparatus, resuscitators, photoionization detectors, aerosol and particulate monitors, mercury monitors, oxygen deficiency indicators and combustible gas detectors.
- B. This equipment should be kept in protected areas and checked at scheduled intervals. A log shall be maintained indicating who checked the equipment, when it was checked, and that it was acceptable. This equipment log shall be updated monthly and be submitted with the monthly report. Equipment that requires calibration shall have copies of dated calibration certificates at the Project Site.

- C. Substitute safety and rescue equipment must be provided while primary equipment is being serviced or calibrated.

3.04 PERSONAL PROTECTIVE EQUIPMENT

- A. All personnel employed by the Contractor, his/her subcontractors and any visitors whenever entering the Project Site shall be required to wear appropriate PPE required for that area of the Project Site. Contractor shall remove from the Project Site any person who fails to comply with this or any other safety requirement. The Contractor shall continuously provide all necessary PPE as requested by the Owner for his/her designated representatives.

3.05 SPILL PREVENTION

- A. The Contractor shall establish a Spill Prevention Program (SPP) for the prevention of spills of petroleum products, hazardous substances and chemicals used by the Contractor in performing the Work. This program shall include awareness training for all workers on measures designed to reduce, minimize and eliminate the potential for spills. The written SPP shall be included in the Contractor's SSHASP.
- B. Spills often occur due to poorly designed, maintained or damaged equipment such as vehicles, construction equipment, pumps, meters, storage tanks, etc. The Contractor shall establish sound work practices and implement appropriate measures such as the following to achieve spill prevention:
 - 1. Use daily or weekly checklists to conduct pre-use inspections of equipment.
 - 2. Emphasize materials handling, labeling and container storage inspection practices.
 - 3. All petroleum products, hazardous substances or chemicals shall be stored in designated areas only and include secondary containment.
 - 4. Use manufacturer recommended maintenance procedures (MPs) to develop Project-specific MPs for certain types of equipment or activities where there is no adequate preventive maintenance schedule in place. If neither exists, the Contractor shall develop equipment-specific MPs.
 - 5. Use breakaway or quick disconnect hoses, and/or absorbent drip pads during product or fuel transfer and dispensing activities.
 - 6. Ensure the proper labeling of valves and ports transferring or receiving chemical or petroleum products.
 - 7. Install secondary containment devices on equipment.
 - 8. Schedule replacement of damaged or old equipment.
 - 9. Inspect for and purge residual materials in piping, tanks and other equipment prior to disassembly, demolition and disposal.

10. Utilize any other appropriate spill prevention measures.
 11. Contractor fuel and chemical deliveries are only permitted during normal work hours as specified in the Contract Documents or as otherwise approved by the Owner.
 12. Third party deliveries shall be witnessed by the Contractor to verify compliance with spill prevention, reporting and response requirements. The Owner shall be provided advance notification of each fuel and chemical delivery.
- C. The Contractor shall bear sole responsibility for all costs and delays resulting from any spills or releases on the Project which occur as a result of the work activities. Any piece of equipment which the Owner determines to be leaking, poorly maintained, defective or otherwise deficient may be prohibited from the Project Site.

END OF SECTION

SECTION 01600 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; product substitutions; and comparable products.
- B. Related Sections include the following:
 - 1. Division 1 Section "References" for applicable industry standards for products specified.
 - 2. Division 1 Section "Closeout Procedures" for submitting warranties for Contract closeout.
 - 3. Division 2 for specific requirements for warranties on products and installations specified to be warranted.

1.3 DEFINITIONS

- A. Products: Items purchased for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
 - 1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature, that is current as of date of the Contract Documents.
 - 2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
 - 3. Comparable Product: Product that is demonstrated and approved through submittal process, or where indicated as a product substitution, to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
- B. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.
- C. Basis-of-Design Product Specification: Where a specific manufacturer's product is named and accompanied by the words "basis of design," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of other named manufacturers.

1.4 SUBMITTALS

- A. Product List: Submit a list, in tabular form, showing specified products. Include generic names of products required. Include manufacturer's name and proprietary product names for each product.
1. Coordinate product list with Contractor's Construction Schedule and the Submittals Schedule.
 2. Form: Tabulate information for each product under the following column headings:
 - a. Specification Section number and title.
 - b. Generic name used in the Contract Documents.
 - c. Proprietary name, model number, and similar designations.
 - d. Manufacturer's name and address.
 - e. Supplier's name and address.
 - f. Installer's name and address.
 - g. Projected delivery date or time span of delivery period.
 - h. Identification of items that require early submittal approval for scheduled delivery date.
 3. Initial Submittal: Within Thirty (30) days after date of Notice of Award, submit Five (5) copies of initial product list. Include a written explanation for omissions of data and for variations from Contract requirements.
 - a. At Contractor's option, initial submittal may be limited to product selections and designations that must be established early in Contract period.
 4. Completed List: Within Sixty (6) days after date of Notice of Award, submit Five (5) copies of completed product list. Include a written explanation for omissions of data and for variations from Contract requirements.
 5. Architect's Action: Architect will respond in writing to Contractor within Fifteen (15) days of receipt of completed product list. Architect's response will include a list of unacceptable product selections and a brief explanation of reasons for this action. Architect's response, or lack of response, does not constitute a waiver of requirement to comply with the Contract Documents.
- B. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
1. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
 - a. Statement indicating why specified material or product cannot be provided.
 - b. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate contractors, that will be necessary to accommodate proposed substitution.
 - c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Significant qualities may include attributes such as

- performance, weight, size, durability, visual effect, and specific features and requirements indicated.
- d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
 - e. Samples, where applicable or requested.
 - f. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
 - g. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
 - h. Research/evaluation reports evidencing compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction.
 - i. Detailed comparison of Contractor's Construction Schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating lack of availability or delays in delivery.
 - j. Cost information, including a proposal of change, if any, in the Contract Sum.
 - k. Contractor's certification that proposed substitution complies with requirements in the Contract Documents and is appropriate for applications indicated.
 - l. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
2. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within Seven (7) days of receipt of a request for substitution. Architect will notify Contractor, through Owner of acceptance or rejection of proposed substitution within Fifteen (15) days of receipt of request, or Seven (7) days of receipt of additional information or documentation, whichever is later.
 - a. Form of Acceptance: Change Order.
 - b. Use product specified if Architect cannot make a decision on use of a proposed substitution within time allocated.
- C. Comparable Product Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
1. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within one week of receipt of a comparable product request. Architect will notify Contractor through Owner of approval or rejection of proposed comparable product request within Fifteen (15) days of receipt of request, or Seven (7) days of receipt of additional information or documentation, whichever is later.
 - a. Form of Approval: As specified in Division 1 Section "Submittal Procedures."
 - b. Use product specified if Architect cannot make a decision on use of a comparable product request within time allocated.
- D. Basis-of-Design Product Specification Submittal: Comply with requirements in Division 1 Section "Submittal Procedures." Show compliance with requirements.

1.5 QUALITY ASSURANCE

- A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, product selected shall be compatible with products previously selected, even if previously selected products were also options.
1. Each contractor is responsible for providing products and construction methods compatible with products and construction methods of other contractors.
 2. If a dispute arises between contractors over concurrently selectable but incompatible products, Architect will determine which products shall be used.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft. Comply with manufacturer's written instructions.
- B. Delivery and Handling:
1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
 2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
 3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
 4. Inspect products on delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.
- C. Storage:
1. Store products to allow for inspection and measurement of quantity or counting of units.
 2. Store materials in a manner that will not endanger Project structure.
 3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
 4. Store cementitious products and materials on elevated platforms.
 5. Store foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
 6. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
 7. Protect stored products from damage and liquids from freezing.
 8. Provide a secure location and enclosure at Project site for storage of materials and equipment by Owner's construction forces. Coordinate location with Owner.

1.7 PRODUCT WARRANTIES

- A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on

product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.

1. **Manufacturer's Warranty:** Preprinted written warranty published by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
 2. **Special Warranty:** Written warranty required by or incorporated into the Contract Documents, either to extend time limit provided by manufacturer's warranty or to provide more rights for Owner.
- B. **Special Warranties:** Prepare a written document that contains appropriate terms and identification, ready for execution. Submit a draft for approval before final execution.
1. **Manufacturer's Standard Form:** Modified to include Project-specific information and properly executed.
 2. **Specified Form:** When specified forms are included with the Specifications, prepare a written document using appropriate form properly executed.
 3. Refer to Division 2 Sections for specific content requirements and particular requirements for submitting special warranties.
- C. **Submittal Time:** Comply with requirements in Division 1 Section "Closeout Procedures."

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

- A. **General Product Requirements:** Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, that are new at time of installation.
1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
 2. **Standard Products:** If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
 3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
 4. Where products are accompanied by the term "as selected," Architect will make selection.
 5. Where products are accompanied by the term "match sample," sample to be matched is Architect's.
 6. Descriptive, performance, and reference standard requirements in the Specifications establish "salient characteristics" of products.
 7. **Or Equal:** Where products are specified by name and accompanied by the term "or equal" or "or approved equal" or "or approved," comply with provisions in Part 2 "Comparable Products" Article to obtain approval for use of an unnamed product.
- B. **Product Selection Procedures:**

1. Product: Where Specifications name a single product and manufacturer, provide the named product that complies with requirements.
2. Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements.
3. Products: Where Specifications include a list of names of both products and manufacturers, provide one of the products listed that complies with requirements.
4. Manufacturers: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements.
5. Available Products: Where Specifications include a list of names of both products and manufacturers, provide one of the products listed, or an unnamed product, that complies with requirements. Comply with provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product.
6. Available Manufacturers: Where Specifications include a list of manufacturers, provide a product by one of the manufacturers listed, or an unnamed manufacturer, that complies with requirements. Comply with provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product.
7. Product Options: Where Specifications indicate that sizes, profiles, and dimensional requirements on Drawings are based on a specific product or system, provide the specified product or system. Comply with provisions in Part 2 "Product Substitutions" Article for consideration of an unnamed product or system.
8. Basis-of-Design Product: Where Specifications name a product and include a list of manufacturers, provide the specified product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product by the other named manufacturers.
9. Visual Matching Specification: Where Specifications require matching an established Sample, select a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.
 - a. If no product available within specified category matches and complies with other specified requirements, comply with provisions in Part 2 "Product Substitutions" Article for proposal of product.
10. Visual Selection Specification: Where Specifications include the phrase "as selected from manufacturer's colors, patterns, textures" or a similar phrase, select a product that complies with other specified requirements.
 - a. Standard Range: Where Specifications include the phrase "standard range of colors, patterns, textures" or similar phrase, Architect will select color, pattern, density, or texture from manufacturer's product line that does not include premium items.
 - b. Full Range: Where Specifications include the phrase "full range of colors, patterns, textures" or similar phrase, Architect will select color, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.2 PRODUCT SUBSTITUTIONS

- A. Timing: Architect will consider requests for substitution if received within Sixty days after the Notice to Proceed. Requests received after that time may be considered or rejected at discretion of Architect.

- B. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
 - 1. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
 - 2. Requested substitution does not require extensive revisions to the Contract Documents.
 - 3. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 - 4. Substitution request is fully documented and properly submitted.
 - 5. Requested substitution will not adversely affect Contractor's Construction Schedule.
 - 6. Requested substitution has received necessary approvals of authorities having jurisdiction.
 - 7. Requested substitution is compatible with other portions of the Work.
 - 8. Requested substitution has been coordinated with other portions of the Work.
 - 9. Requested substitution provides specified warranty.
 - 10. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

2.3 COMPARABLE PRODUCTS

- A. Conditions: Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
 - 1. Evidence that the proposed product does not require extensive revisions to the Contract Documents, that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
 - 2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
 - 3. Evidence that proposed product provides specified warranty.
 - 4. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
 - 5. Samples, if requested.

PART 3 - EXECUTION (Not Used)

END OF SECTION 01600

SECTION 01770 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
 - 1. Inspection procedures.
 - 2. Warranties.
 - 3. Final cleaning.
- B. Related Sections and Contract Documents include the following:
 - 1. Division 1 Section "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.
 - 2. Divisions 2 through 16 Sections for specific closeout and special cleaning requirements for the Work in those Sections.
 - 3. Trade Agreement.
 - 4. General Conditions.

1.3 FINAL COMPLETION

- A. Preliminary Procedures: Before requesting final inspection for determining date of Final Completion, complete the following:
 - 1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
 - 2. Submit certified copy of Final Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect or Owner. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
 - 3. Advise Owner of pending insurance changeover requirements.
 - 4. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
 - 5. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
 - 6. Prepare and submit Project Record Documents, operation and maintenance manuals, damage or settlement surveys, property surveys, and similar final record information.

7. Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.
 8. Terminate and remove temporary facilities from Project site.
 9. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.
 10. Submit a final Application for Payment according to General Conditions.
 11. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
 12. Instruct Owner's personnel in maintenance of products.
- B. Inspection: Submit a written request for final inspection for acceptance. On receipt of request, Architect and Owner will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect or Owner will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.4 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

- A. Preparation: Submit Five (5) copies of list. Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.
1. Include the following information at the top of each page:
 - a. Project name.
 - b. Date.
 - c. Name of Owner
 - d. Name of Architect.
 - e. Name of Contractor.
 - f. Page number.

1.5 WARRANTIES

- A. Submittal Time: Submit written warranties on request of Architect or Owner for designated portions of the Work where commencement of warranties other than date of Final Completion is indicated.
- B. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.
1. Bind warranties and bonds in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch (215-by-280-mm) paper.
 2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.

3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.
- C. Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 - EXECUTION

3.1 FINAL CLEANING

- A. General: Provide final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean site to condition acceptable to the Owner. Comply with manufacturer's written instructions on use of all cleaning products and equipment.
1. Complete the following cleaning operations before requesting inspection for certification of Final Completion for entire Project or for a portion of Project:
 - a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
 - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
 - c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
 - d. Remove tools, construction equipment, machinery, and surplus material from Project site.
 - e. Clean exposed hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
 - f. Remove labels that are not permanent.
 - g. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.
 - h. Leave Project clean and ready for occupancy.

- C. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.

END OF SECTION 01770

SECTION 01781 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for Project Record Documents, including the following:
 - 1. Record Drawings.
 - 2. Record Specifications.
 - 3. Record Product Data.
- B. Related Sections include the following:
 - 1. Division 1 Section "Closeout Procedures" for general closeout procedures.
 - 2. Division 2 specific requirements for Project Record Documents of the Work in those Sections.

1.3 SUBMITTALS

- A. Record Specifications: Submit one (1) copy of Project's Specifications, including addenda and contract modifications.
- B. Record Product Data: Submit Three (3) of each Product Data submittal.
 - 1. Where Record Product Data is required as part of operation and maintenance manuals, submit marked-up Product Data as an insert in manual instead of submittal as Record Product Data.

PART 2 - PRODUCTS

2.1 RECORD SPECIFICATIONS

- A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.
 - 1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 - 2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.

3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
4. For each principal product, indicate whether Record Product Data has been submitted in operation and maintenance manuals instead of submitted as Record Product Data.
5. Note related Change Orders, Record Product Data, and Record Drawings where applicable.

2.2 RECORD PRODUCT DATA

- A. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.
 1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
 3. Note related Change Orders, Record Specifications, and Record Drawings where applicable.

2.3 MISCELLANEOUS RECORD SUBMITTALS

- A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

PART 3 - EXECUTION

3.1 RECORDING AND MAINTENANCE

- A. Recording: Maintain one copy of each submittal during the construction period for Project Record Document purposes. Post changes and modifications to Project Record Documents as they occur; do not wait until the end of Project.
- B. Maintenance of Record Documents and Samples: Store Record Documents and Samples in the field office apart from the Contract Documents used for construction. Do not use Project Record Documents for construction purposes. Maintain Record Documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to Project Record Documents for Architect's and Construction Manager's reference during normal working hours.

END OF SECTION 01781

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SECTION 02931

TREES

PART 1 — GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Furnishing of Trees.
 2. Pre-installation Preparation and Pre-installation Maintenance of Trees at Tree Holding Facility.
 3. Digging of Trees.
 4. Delivery of Trees to Project Site.
 5. Installation of Trees at Project Site.
- B. Related Sections:
1. Section 02810, Irrigation (Not in Contract NIC — for Reference Only).
 2. Section 02910, Planting Soil Preparation (Not in Contract NIC — for Reference Only).
 3. Section 02930, Planting Materials (Not in Contract NIC — for Reference Only).
 4. Section 02935, Landscape Maintenance Period (Not in Contract NIC — for Reference Only).
 5. Section 02936, Landscape Maintenance Period for Trees.
- C. Unit Prices:
1. Provide a unit price for each pesticide application indicated in the Preliminary Pesticide Application Schedule in Part 3 of this Section to establish a bid price.
 2. Provide a unit price for each soil amendment application indicated in the Preliminary Soil Amendment Application Schedule in Part 3 in this Section to establish a bid price.
 3. Unit prices shall be applicable for the cost of additional pesticide and soil amendment applications required beyond the quantity of applications included in the bid and shall be applicable for crediting the Owner for applications included in the bid price which are not required by the Arborist.
 4. Credit Owner for any pesticide or soil amendment applications included in the bid price which are not required by the Arborist.
- D. Alternates: Provide smaller trees as indicated in this Section for Alternate No. 1.

1.2 REFERENCES

- A. ANSI — American National Standards Institute:
1. A300 — Tree, Shrub, and Other Woody Plant Maintenance — Standard Practices.
 2. Z60.1 — American Standard for Nursery Stock.
 3. Z133.1 — Pruning, Repairing, Maintaining, and Removing Trees, and Cutting Brush — Safety Requirements.
- B. ASTM — ASTM International:
1. C 881 — Specification for Epoxy-Resin-Base Bonding Systems for Concrete.

2. D1557 — Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort.
- C. Hortus III — Hortus Third: A Concise Dictionary of Plants Cultivated in the United States and Canada.
- D. USDA — United States Department of Agriculture:
 1. Soil Texture Triangle Classification.
 2. Handbook No. 60.
- E. EPA — Environmental Protection Agency:
 1. Method 8015.
 2. Method 8020.

1.3 DEFINITIONS

- A. Acceptance, Accepted, or Acceptable: Acceptance by the Architect or Arborist in writing.
- B. Agronomist: Agronomist consultant employed by the Architect for Project.
- C. Arborist: Arboricultural consultant employed by Architect for Project.
- D. Architect: Landscape Architect employed by Owner to prepare Landscape Construction Documents for Project.
- E. Caliper: Trunk diameter measured at a point 6 inches above natural ground surface for trees up to 4 inches caliper, and measured at a point 12 inches above natural ground surface for trees over 4 inches in caliper.
- F. Drip Line: Line straight down from outermost limits of tree canopy branching.
- G. Excessive Compaction of Soil or Soil Mix: Compaction greater than 75 percent dry density as determined by ASTM D 1557.
- H. Extra Trees or Overstock Trees: Extra furnished trees to be used as replacement trees.
- I. Injury: Any bruising, scarring, tearing, or breaking of roots, branches, or trunk.
- J. Pest: Insects, mice and other animals, unwanted plants (weeds), fungi, or microorganisms like bacteria and viruses.
- K. Pesticide: Any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any pest. Though often misunderstood to refer only to *insecticides*, the term pesticide also applies to herbicides, fungicides, and various other substances used to control pests. Under United States law, a pesticide is also any substance or mixture of substances intended for use as a plant regulator, defoliant, or desiccant.
- L. Plant Height: Measurement of main body height, not measurement to top branch.
- M. Plant Spread: Measurement of main body diameter, not measurement from branch tip to tip.

- N. Replacement Tree: Tree used as a replacement for dead tree or tree not in a vigorous, thriving condition, as determined by the Arborist.
- O. Significant Pest: A pest that seriously threatens or has the potential to seriously threaten the plant health and appearance of the tree, as determined by the Arborist.
- P. Swamp White Oak: A native tree species to the local climate meeting LEED requirements, known by the botanical name of *Quercus bicolor*.
- Q. Sweetgum: A native tree species to the local climate meeting LEED requirements, known by the botanical name of *Liquidambar styraciflua*.
- R. Tree Planting Zones: Zones of trees indicated on the Tree Planting Zone Plan.
- S. Tree Protection Zone: The ground area and space above the paving area within the tree drip line, unless indicated otherwise on the Drawings.
- T. Undue Stress: Stressed condition of tree's health caused by the Contractor's failure to meet requirements of this Section.
- U. Significant Pest: A pest that seriously threatens or has the potential to seriously threaten the plant health and appearance of the tree, as determined by the Arborist.
- V. Zone 1 Trees: Sweetgums and Swamp White Oaks within the Plaza area, as indicated on the Tree Planting Zone Plan.
- W. Zone 2 Trees: Swamp White Oaks within the West Street Sidewalk area, as indicated on the Tree Planting Zone Plan.
- X. Zone 3 Trees: Swamp White Oaks within the Liberty, Fulton, and Greenwich Sidewalk areas, as indicated on the Tree Planting Zone Plan.
- Y. Zone 4 Trees: Swamp White Oaks at northeast corner area, as indicated on the Tree Planting Zone Plan.

1.4 ACTION SUBMITTALS

- A. General Requirements: Refer to Section 01330.
- B. Product Data:
 - 1. Wood Chip Mulch.
 - 2. Anti-desiccant.
 - 3. Soil Amendments.
 - 4. Pesticides.
 - 5. Moisture Sensors and Related Materials and Equipment.
 - 6. Back-up Drip Irrigation Bags.
 - 7. Guy Straps.
 - 8. Cable, Cable Tensioners, Eyebolts, Wire Rope Clips, and Wire Rope Thimbles.
- C. Tree Holding Facility Shop Drawings:
 - 1. Submit Shop Drawings of holding facility site drawn to scale, dimensioned and with materials, equipment, and system components labeled.

2. Include layout plan, with a “true north” arrow, showing perimeter security fence, fence gates, vehicular access routes, tree locations, equipment, irrigation lines, water supply, storage structure, and security camera layout.
3. Include detailed sections and elevations showing fence, fence gates, irrigation, system components, guying system, drainage system, and surface paving materials.
4. Include drainage plan showing surface slopes, drain locations, and swale locations.
5. Include a site location map showing holding facility location relative to Project site, streets and highways adjacent to holding facility, and precise route for transporting trees to Project site.
6. Submit Shop Drawings in digital PDF file format to the Owner’s Representative, Architect, and Arborist via e-mail.

D. Samples:

1. Wood Chip Mulch — 1/2-pound bag.
2. Organic Amendment — 1-pound bag.
3. Topsoil — 2-pound bag.
4. Guy Straps — 3 straps.
5. Tree Wrap — 3-foot length.

E. Test Reports:

1. Laboratory soil test reports for composite soil samples taken from tree root balls, with test date less than 2 weeks old.
2. Laboratory water test reports for representative irrigation water samples, with test date less than 2 weeks old.
3. Laboratory soil test reports indicating specified characteristics of topsoil, with test date less than 2 weeks old.
4. Laboratory test report for organic amendment indicating specified characteristics of organic amendment, with test date less than 2 weeks old.
5. Laboratory test report for wood chip mulch, indicating specified physical and chemical characteristics, with test date less than 2 weeks old.

1.5 INFORMATIONAL SUBMITTALS

A. General Requirements: Refer to Section 01330.

B. Plant Material Photographs:

1. At least 14 days prior to submittal of plant material location data, submit color photographs of representative plants of each type and plant material.
2. Submit 4 photos of each representative tree taken from positions approximately 90 degrees on center around tree.
3. Indicate height of tree in each photograph via a telescoping measuring rod that has 12-inch increment marks which are clearly visible in the photograph.

C. Plant Material Location Data:

1. Quantities of each plant material type at each nursery or other place of growth.
2. Address, phone number, location map, and contact person for each nursery or other place of growth.

D. Product Purchase and Delivery Documentation: Within 5 working days of each soil application of soil amendment and pesticide, submit purchase orders, invoices, and

receipts showing supplier name and address, person who sold product, date of purchase, specific product purchased, quantity purchased, and delivery date.

- E. Maintenance Log:
1. Using a tree inventory database, maintain a daily record of observations and Work performed on an individual tree basis.
 2. Record precipitation from on-site rain gauge; time and duration of each water application; chemical and fertilizer applications; irrigation problems; drainage problems; soil temperatures; visual observations of plants; tests performed; moisture sensor readings; annual twig elongation rate; height growth progress; and fall color.
 3. Make log available for review at any time by the Owner, the Arborist, and the Architect.
 4. Submit weekly a digital copy via e-mail to the Owner's Representative, Arborist, and Architect by the Tuesday following the week of the observations and Work.
- F. Stressed Plant Condition Inspection Reports: Plant inspection report documenting damage and signs of stress, pests, and disease, submitted via e-mail to the Owner's Representative, the Architect, and the Arborist within 48 hours of observation.
- G. Fall Color Photo Log:
1. Develop, maintain, and submit, at times indicated in this Section, a photo log of the fall color of each sweetgum tree for the purpose of selecting suitable, well-matched specimens for planting at the Project site.
 2. Include 2 photos of each tree taken from opposite sides of the crown for each year the sweetgum trees are in the Tree Holding Facility so that consistency in coloration from year to year can be evaluated by the Architect.
 3. Take photos at the peak of fall coloration.
 4. Take photos with a digital camera with at least 5.0 megapixels of resolution and ensure that the natural color of the foliage is depicted as accurately as possible.
- H. Certificates:
1. Arborist Certifications.
 2. Pesticide Applicator Certifications indicating pesticide applicator is currently certified by the State in which the application will take place.
- I. Selected Trees for Installation:
1. Preliminary Recommendations.
 2. Final Recommendations.
- J. Manufacturer's Installation Instructions:
1. Current Printed Application Instructions for Root Growth Regulator.
 2. Current Printed Installation Instructions for Moisture Sensor Access Tubes.
- K. Documentation of Owner Accepted Conditions: Within 7 working days after the Owner's acceptance of maintenance, submit color photographs and a written report documenting the Owner's accepted conditions of the plant material.

1.6 QUALITY ASSURANCE

- A. Qualifications of Contractor Providing and Maintaining Trees:
1. Established history of specializing in the large tree transplanting of at least 15 years operating under the same company name and management.

2. Able to demonstrate proficiency in tree transplanting using hydraulic tree spades and shall submit documentation of experience with project name, customer and customer contact information of at least 3 projects with in the last 5 years utilizing tree spade transplanting technology.
 3. Able to demonstrate proficiency in tree transplanting using tree-boxing techniques and shall submit documentation of experience with project name, customer and customer contact information of at least 3 projects with in the last 5 years utilizing tree-boxing technologies.
 4. Able to demonstrate proficiency in managing a boxed tree nursery started from field-collected trees and shall submit documentation of experience with project name, customer and customer contact information of at least 3 box-tree nurseries from harvested tree stock that the bidder managed with in the last 5 years.
 5. Able to demonstrate the ability to execute large-scale tree transplanting jobs and shall submit documentation of experience with project name, customer, and customer contact information of at least 3 tree transplanting projects completed with in the last 5 years.
 6. Arborist on staff with current ISA certification.
 7. Implemented OSHA approved safety program that meets OSHA and ANSI Z133.1 requirements.
 8. Director of safety on staff who is trained and approved to OSHA standards.
 9. On-site Work supervisor shall have current arborist certification from the ISA and shall have demonstrated skill and experience in the particular tasks being performed.
- B. Pesticide Applicator Qualifications: Pesticide treatments shall be performed by an acceptable, qualified, and experienced plant health care technician that is currently state-certified to be a commercial pesticide applicator in the state where the application takes place.
- C. Regulatory Requirements:
1. Meet requirements of applicable OSHA regulations, laws, codes, and other regulations required by authorities having jurisdiction over Work.
 2. Provide for inspections and permits required by Federal, State and local authorities in furnishing, transporting, and installing materials.
- D. Pre-Tree Tagging Meeting: Prior to commencement of Work under this Section, schedule and conduct a meeting with the Owner's Representative, Architect and Arborist to review the requirements of this Section and to review the schedule for periodic reviews by the Architect and Arborist.
- E. Root Ball Anchor System Mock-ups:
1. Install one complete root ball anchor system on an installed Zone 1 tree, and install one complete root ball anchor system on a Zone 2 or Zone 3 tree.
 2. Accepted mock-up shall become Project standard by which work will be judged.
 3. Accepted mock-up may remain in place as part of permanent installation.
- 1.7 LIFTING, HANDLING, TRANSPORT, AND DELIVERY OF TREES TO PROJECT SITE
- A. Deteriorated Box Materials:
1. Prior to lifting boxed trees, carefully inspect box materials.
 2. Remove materials that have deteriorated and are not capable of holding root balls solid and firm during lifting, handling, and transport of trees.
 3. Replace removed materials with new materials prior to moving trees.

- B. Lifting and Handling Trees:
 - 1. Lift boxes with adequate support to avoid damage to boxes and root balls, to prevent injury to trees and roots, and to prevent displacement of soil from the boxes..
 - 2. Do not lift trees by trunks.
 - 3. Do not bind or handle trees with wire or wire rope.
 - 4. Pad trunks and branches wherever hoisting cables or straps contact.

- C. Protection of Trees during Transport:
 - 1. Treat trees with anti-desiccant spray applied to the trunk, branches, and twigs, no more than 72 hours and no less than 24 hours prior to transport, as directed by the Arborist.
 - 2. Wrap trunk of each tree with tree wrap, if directed by the Arborist.
 - 3. Tie branches with rope or twine in such a manner that no injury will occur to the bark or branches.
 - 4. Exercise care to prevent injury and drying out of the trees and root balls.
 - 5. Protect plants from sun and drying winds.
 - 6. Once loaded and secured onto the transport vehicle, cover trees with a securely fastened, open-weave shade tarp that minimizes desiccation while permitting sufficient cool air flow.
 - 7. Remove the shade tarp immediately upon arrival at the Project Site.

- D. Transport of Trees:
 - 1. To the extent that schedules permit, transport trees from the Tree Holding Facility to the Project Site, while dormant and before spring bud swell.
 - 2. If construction schedule dictates that the trees must be transported and planted while in leaf, transport trees during the night or early morning hours to minimize desiccation.
 - 3. Transport no more trees from the Tree Holding Facility to the Project Site than can be installed within 48 hours, unless accepted otherwise by the Arborist.

- E. Temporary Storage of Trees at Project Site Prior to Installation:
 - 1. Protect plant root balls from sun and drying winds.
 - 2. Keep root balls moist.
 - 3. Keep sun-sensitive plants shaded.
 - 4. Anchor plants to prevent injury from strong winds.

- F. Owner-Supplied Sweetgum Trees:
 - 1. Prior to submitting bid, review plant materials at the source to verify that plants are undamaged, healthy, accessible for digging, and satisfactory for which to provide the Warranty requirements of this Section.
 - 2. Notify Owner in writing, prior to submitting bid, if unsatisfactory conditions are found that will not allow the plants to be warranted as described in this Section.
 - 3. The Contractor, by performing pre-installation preparation Work and pre-installation maintenance Work on plant material and without providing written notification of unsatisfactory conditions, assumes Warranty responsibilities for the plant material as described in this Section.

1.8 SEQUENCING AND SCHEDULING

- A. Commencement of Pre-installation Preparation and Maintenance Work:
 - 1. Start Work sequence for Zone 1, 2, and 3 trees in fall, 2006.
 - 2. Start Work sequence for Zone 4 trees in fall, 2007.
 - 3. Start Work sequence for 7 extra sweetgums in fall, 2006.

4. Start Work sequence for 3 extra sweetgums in fall, 2007.
 5. Start Work sequence for 33 extra swamp white oaks in fall, 2006.
 6. Start Work sequence for 18 extra swamp white oaks in fall, 2007.
 7. Start Work sequence for 3 extra swamp white oaks in fall, 2008.
- B. Installation of Trees at Project Site Relative to Other Work at Project Site: Transport trees to Project site and install trees after paving support structure, stone slab pavers, soil mixes, deadman assemblies, and irrigation system are installed, and after irrigation system has been tested, adjusted, and is operating correctly.
- C. Installation of Trees at Project Site:
1. Install Zone 1 trees during March, 2009.
 2. Install Zone 2 trees between October 15 and November 15, 2008.
 3. Install Zone 3 trees during June, 2009.
 4. Install Zone 4 trees during July, 2010.

1.9 SITE CONDITIONS

- A. Environmental Requirements: Do not apply materials to tree foliage during windy conditions, when ambient air temperatures are above 80 degrees Fahrenheit or below 45 degrees Fahrenheit, or when precipitation is expected within 12 hours.

1.10 WARRANTY

- A. Warranty Period: For each tree planting zone, warrant that trees, including Owner-supplied trees, will be healthy and in a vigorous, flourishing condition of active growth for 2 full calendar years from date of acceptance of tree installation Work in the respective tree planting zone.
- B. Delays: Delays in commencement of tree installation operations shall extend the Warranty Period correspondingly.
- C. Condition of Trees: Trees shall be free of dead or dying, injured, or diseased branches and branch tips, with foliage of a normal density, size and color.
- D. Incorrect Materials:
1. During Warranty Period, replace at no additional cost to the Owner, trees revealed as being untrue name, as determined by its form, leaf, flower, and/or fruiting characteristics, in accordance with Hortus III.
 2. Provide replacement trees of a size and quality to match the installed trees at the time the mistake is discovered.
- E. Replacement Trees:
1. As soon as weather and seasonal conditions permit, replace at no additional cost to the Owner, dead trees and trees not in a vigorous, thriving condition, as determined by the Arborist during and at the end of Warranty Period.
 2. Apply requirements of this Section to replacements, except length of Warranty Period.
 3. Warranty period for replacement trees shall apply from the time of replacement until the end of the 2-year warranty period for respective tree planting zone.
 4. At the end of the 2-year warranty period, Contractor shall relocate and plant any remaining overstock trees at a location to be determined by Owner, not more than 50 miles from the Tree Holding Facility.

1.11 MAINTENANCE

- A. Maintenance of Trees after Installation: Refer to Section 02936.
- B. Maintenance of Extra Trees: Refer to Section 02936.

PART 2 — PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS AND SUPPLIERS

- A. Anti-desiccant: Miller Chemical & Fertilizer Corporation, Hanover, PA, (717) 632-8921, www.millerchemical.com or accepted substitute.
- B. Soil Amendments:
 - 1. Plant Health Care Inc., Pittsburgh, PA, (800) 421-9051, www.planthealthcare.com; or accepted substitute.
 - 2. Mycorrhizal Applications, Inc., Grants Pass, OR; (514) 476-3985; www.mycorrhizae.com; or accepted substitute.
 - 3. Bio-Plex, Manheim, PA, (800) 441-3573, www.bio-plex.com; or accepted substitute.
 - 4. The Doggett Corporation, Lebanon, NJ; (908) 236-6335, www.doggettcorp.com; or accepted substitute.
 - 5. LimeCrest Corp., Sparta, NJ; (973) 383-2000; or accepted substitute.
 - 6. Vermi Technology Unlimited, Orange Lake, Fla.; (352) 591-1111; www.vermitechnology.com; or accepted substitute.
- C. Pesticides:
 - 1. Insecticide for Control of Borers (Merit 75 WSP): Bayer CropScience Research, Triangle Park, NC; (800) 842-8020, www.bayercropscienceus.com; or accepted substitute.
 - 2. Insecticide (Astro) for Control of Leaf Chewing Caterpillars And Aphids: FMC Corp, Philadelphia, PA; (215) 299-6000, www.fmc.com; or accepted substitute.
 - 3. Insecticide (Horticultural Oil) for Control of Scale Insects: Lesco, Inc., Cleveland, OH; (216) 706-9250, www.lesco.com; or accepted substitute.
 - 4. Miticide (Avid) For Control of Spider Mites: Syngenta Professional Products, Greensboro, NC; (866) 796-4368, www.syngentaprofessionalproducts.com; or accepted substitute.
 - 5. Fungicide (Banner Maxx) for Treatment of Anthracnose: Ciba-Geigy Corp., Greensboro, NC; or accepted substitute.
 - 6. Spreader Sticker (Nu-Film) Spray Adjuvant: Miller Chemical and Fertilizer Corp., Hanover, PA; (717) 632-8921, www.millerchemical.com; or accepted substitute.
 - 7. Herbicide for Weed Control (RoundUp): Monsanto Co., St. Louis, MO; (314) 694-1000, www.monsanto.com; or accepted substitute.
 - 8. Root Growth Regulator: SePRO Corporation, Carmel, IN; (317) 580-8282; www.sepro.com or accepted substitute.
- D. Back-up Drip Irrigation Bags: Spectrum Products, Inc., Youngsville, NC, (866) 873-3428, www.treegator.com or accepted substitute.
- E. Moisture Sensors and Related Materials and Equipment: Dynamax Inc., Houston, TX; (800) 896-7108; www.dynamax.com or accepted substitute.

- F. Guy Straps for Boxed Trees: Straps specifically designed for guying trees, without damaging the bark, and strong enough to hold trees upright during high winds.
- G. Cable Tensioners Root Ball Anchor Systems: Foresight Products, Commerce City, CO; (303) 286-8955; www.earthanchor.com; or accepted substitute.
- H. Eyebolts, Anchor Cable, Wire Rope Clips, and Wire Rope Thimbles for Root Ball Anchor Systems: McMaster-Carr, Los Angeles, CA; (562) 692-5911; www.mcmaster.com; or accepted substitute.

2.2 MATERIALS

- A. Requirements for Trees at Time of Tagging:
 - 1. Sweetgum Source: Nursery-grown or field-collected, meeting climatic growing condition requirements.
 - 2. Swamp White Oak Source: Nursery-grown from locations meeting the climatic growing condition requirements.
 - 3. Quantity of Sweetgums for Zone 1: 44 trees. Five of the 44 trees will be supplied by the Owner.
 - 4. Quantity of Swamp White Oaks for Zone 1: 239 trees.
 - 5. Quantity of Swamp White Oaks for Zone 2: 33 trees.
 - 6. Quantity of Swamp White Oaks for Zone 3: 51.
 - 7. Quantity of Swamp White Oaks for Zone 4: 34 trees.
 - 8. Extra Sweetgums: 10 trees.
 - 9. Extra Swamp White Oaks: 54 trees.
 - 10. Base Bid Size for Swamp White Oaks: 6.5 to 7.5-inch minimum caliper, 22 to 26 feet height, with trees from northern sources in upper half of height range to account for slower growth rate, lowest branch a minimum 6 feet from top of root ball, matched spread plus or minus 24 inches measured when plants are in normal, upright position.
 - 11. Alternate No. 1 Size for Swamp White Oaks: 4 to 5-inch caliper, 16 to 19 feet height with trees from northern sources in upper half of height range to account for slower growth rate, lowest branch a minimum 6 feet from top of root ball, matched spread plus or minus 18 inches measured when plants are in normal, upright position.
 - 12. Base Bid Size for Sweetgums: 7 to 7.5-inch minimum caliper, 24 to 26 feet height, with trees from northern sources in upper half of height range to account for slower growth rate, lowest branch a minimum 6 feet from top of root ball, matched spread plus or minus 24 inches measured when plants are in normal, upright position.
 - 13. Alternate No. 1 Size for Sweetgums: 4.5 to 5-inch caliper, 18 to 19 feet height with trees from northern sources in upper half of height range to account for slower growth rate, lowest branch a minimum 6 feet from top of root ball, matched spread plus or minus 18 inches measured when plants are in normal, upright position.
 - 14. Nomenclature: Plant nomenclature shall meet requirements of Hortus III.
 - 15. Climatic Growing Conditions: Grown in USDA Hardiness Zone 6b or colder, for at least two years, immediately prior to tagging, unless accepted otherwise by the Arborist.
 - 16. Root Ball Size: 90-inch diameter.
 - 17. Trunk: Single leader to at least 66 percent of height, structurally strong, able to stand upright without stakes or guys on a windless day.

18. Branching: Well-spaced and well-formed with strong attachments, symmetrical, tightly knit, so trained or favored in development and appearance as to be superior in form, number of branches, compactness and symmetry.
 19. Vigor: Healthy, vigorous, and densely foliated when in leaf, with at least 12 inches average annual twig elongation in top 30 percent of crown over past 3 years, and with good leaf size and good leaf color.
 20. Disease and Pests: Free of significant pests, eggs, or larvae.
 21. Root System: Root collar even with or near ground surface at site where trees are tagged, healthy, well-developed root density and distribution, free of kinked roots, circling roots, girdling roots, root-bound condition, cracked root balls, or broken root balls.
 22. Pruning: Do not prune, thin or shape plants before delivery without acceptance by the Arborist.
 23. Unacceptable Conditions: Multiple leaders, unless specified, damaged or crooked leaders, bark abrasions, sunscald, disfiguring knots, or fresh cuts of limbs over 3/4-inch diameter which have not completely callused.
 24. Root Ball Top Slope: Within 1 inch of level straight edge laid across top of root ball.
- B. Owner-Supplied Sweetgum Trees for Zone 1:
1. Five of 44 Sweetgum trees have been tagged by the Architect and will be supplied by the Owner.
 2. Prior to submitting bid, review trees at the source to verify trees are healthy, free of injury, accessible for digging, and satisfactory for which to provide the Warranty of this Section.
 3. Along with bid, notify the Owner in writing of unsatisfactory conditions observed that do not allow the trees to be warranted as indicated in this Section.
 4. The installer, by performing pre-installation preparation and maintenance Work on the trees, and without written notification of unsatisfactory conditions, assumes the Warranty responsibilities for the trees, as described in this Section.
- C. Requirements for Trees at Time of Installation:
1. Base Bid Tree Lowest Branch Height: 10 to 13 feet.
 2. Alternate No. 1 Tree Lowest Branch Height: 8.5 to 10 feet.
 3. Base Bid Tree Height: 25 to 29 feet.
 4. Alternate No. 1 Tree Height: 19 to 23 feet.
 5. Base Bid Tree Caliper: 7.5 to 9 inches.
 6. Alternate No. 1 Tree Caliper: 5.5 to 6.5 inches.
 7. Trunk: Single, well-developed, well-formed, straight leader to top of canopy.
 8. Branching: Well-spaced and well-formed with strong attachments, symmetrical, tightly knit, so trained or favored in development and appearance as to be superior in form, number of branches, compactness and symmetry, with matched lower branch height, canopy height, and crown form.
 9. Vigor: Free of significant insects and diseases, at least 12 inches average annual twig elongation in top 30 percent of crown for 2 growing seasons prior to installation, and with good leaf size and good leaf color.
 10. Root System: Root collar even, with healthy, well-developed root density and distribution, free of kinked roots, circling roots, girdling roots, root-bound condition, cracked root balls, or broken root balls.
 11. Root Collar: Exposed root collar above root ball surface.
 12. Climatic Adaptation: Grown under similar climatic conditions as Project site for a minimum 2 years prior to installation.
 13. Root Ball Top Slope: Within 1/2- inch of level straight edge laid across top of root ball.

D. Topsoil for Backfill Soil Mix:

1. General: Topsoil shall be friable and have sufficient structure in order to give good tilth and aeration to the soil. When amended, fertilized, and conditioned, the soil must be friable, be well drained, and be supportive of vigorous plant growth. It must contain low concentrations of inhibitory constituents. Plant growth of dicots and monocots must be at least 80 percent of a known reference soil, free of inhibitory constituents. A soil containing inhibitory constituents will be deemed to be suitable if the inhibitory constituents can be properly counteracted. The soil must have sufficient moisture retention and nutrient retention to avoid excessive frequency of irrigation and frequency of fertilizer application. The soil must be clean and free of excessive gravel, rock, and physical impurities.
2. Deleterious Materials: Free of roots, clods, stones larger than 1 inch in the greatest dimension, pockets of coarse sand, noxious weeds, sticks, lumber, brush, and other debris.
3. Disease-causing Organisms: Free of infestation of nematodes or other undesirable disease-causing organisms such as insects and plant pathogens.
4. Gradation: Sandy loam as classified by the USDA Soil Texture Triangle classification method.
5. Permeability Rate: Hydraulic conductivity rate shall be not less than 1 inch per hour, nor more than 20 inches per hour when tested in accordance with the USDA Handbook, No. 60, Method 34B or other approved methods.
6. Fertility: The range of the essential elemental concentration in soil shall be as follows:

<i>Ammonium Bicarbonate / DTPA Extraction</i>	
<i>Parts per million (mg/kg dry-weight basis)</i>	
<hr/>	
Phosphorus:	20.0 – 40.0
Potassium:	40.0 – 220.0
Iron:	2.0 – 35.0
Manganese:	0.3 – 6.0
Zinc:	0.6 – 8.0
Copper:	0.1 – 5.0
Boron:	0.2 – 1.0
Magnesium:	50.0 – 150.0
Sodium:	0 – 100.0
Sulfur:	25.0 – 500.0
Molybdenum:	0.1 – 30.0

7. Acidity: 6.0 – 7.0 soil pH range measured in the saturation extract (Method 21a, USDA Handbook No. 60).
8. Salinity: 0.5 – 2.0 dS/m salinity range measured in the saturation extract (Method 3a, USDA Handbook No. 60). If calcium and if sulfate ions both exceed 20 milliequivalents per liter in the saturation extract, the maximum salinity shall be 4.0 dS/m.
9. Chloride: 150 mg/liter (parts per million) maximum concentration of soluble chloride in the saturation extract (Method 3a, USDA Handbook No. 60).
10. Boron: 1-mg/liter (parts per million) maximum concentration of soluble boron in the saturation extract (Method 3a, USDA Handbook No. 60).
11. Sodium Adsorption Ratio (SAR): Maximum of 3 measured per Method 20b, USDA Handbook No. 60.
12. Soil Organic Matter Content: Sufficient soil organic matter present to impart good physical soil properties, but not be excessive to cause toxicity or cause excessive reduction in the volume of soil due to decomposition or organic matter.
13. Calcium Carbonate Content: No free calcium carbonate (limestone) present.

14. Available Aluminum: Less than 5 parts per million measured with the Ammonium Bicarbonate/DPTA Extraction.
15. Heavy Metals: The maximum permissible elemental concentration in the soil shall not exceed the following:

*Ammonium Bicarbonate / DPTA
Extraction
Parts per million (mg/kg dry-
weight basis)*

Arsenic	2.0
Cadmium	2.0
Chromium	10.0
Cobalt	2.0
Lead	30.0
Mercury	1.0
Nickel	5.0
Selenium	3.0
Silver	0.5
Vanadium	3.0

If the soil pH is between 6.0 and 7.0, the maximum permissible elemental concentration shall be reduced 50 percent. If the soil pH is less than 6.0, the maximum permissible elemental concentration shall be reduced 75 percent. No more than three metals shall be present at 50 percent or more of the above values.

16. Phytotoxic Constituent, Herbicides, Hydrocarbons, etc.: Total petroleum hydrocarbons shall not exceed 50 mg/kg dry soil measured per the modified EPA Method No. 8015. Total aromatic volatile organic hydrocarbons (benzene, toluene, xylene and ethylbenzene) shall not exceed 2 mg/kg dry soil measured per EPA Method No. 8020.
- E. Organic Amendment: Organic material is to be well-composted humus with the following properties:
1. Humus material shall have an acid-soluble ash content of no less than 5 percent and no more than 20 percent.
 2. The pH of the material shall be between 6 and 7.5.
 3. The salt content shall be less than 10 millimho/cm at 25 degrees C on a saturated paste extract.
 4. Boron content of the saturated extract shall be less than 1.0 part per million
 5. Silicon content (acid-insoluble ash) shall be less than 50 percent.
 6. Calcium carbonate shall not be present if the amendment is to be applied on alkaline soils.
 7. Types of acceptable products are composts, manures, mushroom composts, straw, alfalfa, sludge, peat mosses, etc., low in salts, low in heavy metals, free from weed seeds, free of pathogens and other deleterious materials.
 8. Composted wood products are conditionally acceptable (stable humus must be present). Wood-based products are not acceptable which are based on redwood or cedar.
 9. Sludge-based materials are not acceptable if the soil already has a high level (toxic level) of zinc, copper, or other heavy metals based on soil analysis.
 10. Carbon-nitrogen ratio shall be less than 25:1.
 11. The compost shall be aerobic without malodorous presence of decomposition products.

12. The maximum particle size shall be 0.5-inch and 80 percent or more shall pass a No. 4 screen for mixing with soil. The maximum particle size for applying via hydroseeding machine shall be 0.25-inch.
13. Maximum total permissible pollutant concentrations in organic amendment in parts per million on a dry-weight basis:

Arsenic:	20
Cadmium:	15
Chromium:	300
Cobalt:	50
Copper:	150
Lead:	200
Mercury:	10
Molybdenum:	60
Nickel:	100
Selenium:	50
Silver:	10
Vanadium:	200
Zinc:	300

14. From 45- to 65-percent moisture measured via wet-weight basis.
15. Free of stones and debris.
16. Tests 5 to 8 on Solvita Test.

F. Irrigation Water: Clean, fresh, free of substances toxic to plant growth, with the following chemical properties:

Acceptable pH:	6.5 to 8.4
Total Dissolved Solids:	< 600 mg/l
Electrical Conductivity:	< 0.8 millimho/cm
Boron:	< 0.5 mg/l
Chloride:	< 100 mg/l
Sodium:	< 70 mg/l
Adjusted SAR (sodium absorption ratio):	< 3.0
Bicarbonate:	< 100 mg/l
Redox:	300 millivolts or higher
Dissolved Oxygen:	2 mg/l or higher
Total Hydrocarbons:	< 20 ppm
BTEX:	< 0.5 ppm
Iron:	< 1.0 mg/l
Manganese:	< 0.2 mg/l
Zinc:	< 2.0 mg/l

Copper:	< 0.2 mg/l
Molybdenum:	< 0.01 mg/l
Aluminum:	< 5.0 mg/l
Arsenic:	< 0.1 mg/l
Cadmium:	< 0.01 mg/l
Chromium:	< 0.1 mg/l
Cobalt:	< 0.01 mg/l
Lead:	< 5.0 mg/l
Lithium:	< 2.5 mg/l
Nickel:	< 0.2 mg/l
Selenium:	< 0.02 mg/l
Vanadium:	< 0.1 mg/l

- G. Wood Chip Mulch: Course shredded hardwood mulch derived from tree pruning and removal waste with at least 70 percent of the particles by mass at least 1 inch and no more than 3 inches in their largest dimension, free of non-organic materials and contaminants, and properly composted at least 6 months in a manner to sufficiently suppress disease organisms and weed seeds.
- H. Anti-desiccant: Vapor Gard.
- I. Pesticides:
1. Insecticide for Control of Flat-Headed Borers: Merit 75 WSP (Imidacloprid); or accepted substitute.
 2. Insecticide for Control of Leaf Feeding Caterpillars and Aphids: Astro (Permethrin); or accepted substitute.
 3. Insecticide for Control of Scale Insects: Horticultural Oil, (superior horticultural oil); or accepted substitute.
 4. Miticide for Control of Spider Mites: Avid 0.15 EC, (Abamectin) ; or accepted substitute.
 5. Fungicide for Control of Oak Anthracnose: Banner Maxx, (Propiconazole); or accepted substitute.
 6. Herbicide for Control of Invasive Weeds: Round-Up (Glyphosate); or accepted substitute.
 7. "Spreader-Sticker" Spray Adjuvant to be Mixed with Certain Pesticides: Nu-Film; or accepted substitute.
 8. Root Growth Regulator: Spin Out; or accepted substitute.
- J. Potential Soil Amendments to be Required by Soil Amendment Program Determined by the Arborist and Agronomist:
1. Doggett Injecto Feed 32-7-7; or accepted substitute.
 2. Doggett Injecto Feed 12-24-24; or accepted substitute.
 3. AgriPlex Micro-Mix micronutrient supplement; or accepted substitute.
 4. PHC BioPak Plus 3-0-20 micronutrient biofertilizer; or accepted substitute.

5. Soluble Mycorrhizal Drench; or accepted substitute.
 6. Bio-Plex Technical Concentrate and Plant Enhancer biostimulant; or accepted substitute.
 7. Doggett Nutri-Sul 90 Elemental Sulfur 90%; or accepted substitute.
 8. Pulverized limestone, dolomitic or non-dolomitic; or accepted substitute.
 9. Other soil amendments that may be required, subject to acceptance of the Arborist; or accepted substitute.
- K. Soil Amendment for Backfill Soil Mix in Wood Tree Boxes: Vermi Technology Pure Black Castings.
- L. Tree Wrap: Burlap, untreated, 4 inches wide.
- M. Moisture Sensors and Related Materials and Equipment: One PR2/6 100 cm probe, one HH2 portable data logger, one SM200 single sensor, one hundred 1 meter long access tubes, one ATL1-CLMP access tube clamp, one PR-AUG2 tube auger and one AT-ROD1 insertion rod.
- N. Back-up Drip Irrigation Bags: 20-gallon TreeGator Original; or accepted substitute.
- O. Tree Protection Fencing for Perimeter of Tree Protection Zones: Galvanized steel, 2-inch by 2-inch chain link mesh by 6-foot minimum height with 2-inch diameter galvanized steel posts.
- P. Snow Fencing to Protect Tree Trunk: Wooden slat and wire type.
- Q. Plastic Construction Barrier Fencing to Protect Tree Branches: Orange, plastic, 4-foot high barrier fencing.
- R. Boards for Root Ball Anchor Systems: Wood, pressure-treated with .40 PCF ACQ, sizes indicated on the Drawings.
- S. Eyebolts for Deadman Assemblies: Forged steel, hot-dip galvanized, plain pattern, 5/8-inch diameter, 1.25-inch minimum inside diameter hole, 8 inches long, 3,500-pound working load limit.
- T. Eyebolts for Root Ball Stabilizer Boards: Forged steel, hot-dip galvanized, shoulder pattern, 5/16-inch diameter, 0.63 inside diameter hole, 2.25 inches long, 800-pound work load limit.
- U. Eyebolts in Reinforced Concrete Slab: Forged steel, hot-dip galvanized, shoulder pattern, 5/8-inch diameter, 1.25 inside diameter hole, 4 inches long, 3,500-pound work load limit.
- V. Nuts for Eyebolts: Heavy hex, hot-dip galvanized, size to fit eyebolt.
- W. Flat Washers for Eyebolts: Steel, hot-dip galvanized, size to fit eyebolt.
- X. Cable Tensioners for Root Ball Anchor Systems: Manta Ray 1-RT-10 ratchet tensioner; or accepted substitute.
- Y. Anchor Cables for Root Ball Anchor Systems: Galvanized steel, 5/16-inch diameter, 7X9 strand core wire rope, 9,800 pounds breaking strength.

- Z. Wire Rope Clips and Thimbles for Anchor Cables of Root Ball Anchor Systems: Crosby forged steel clips, size to fit wire rope; and hot-dip galvanized steel thimbles, size to fit rope.
- AA. Adhesive for Anchoring Eyebolts into Concrete: ASTM C 881, 2 component, chemical-resistant, structural epoxy bonding system, formulated for exterior use in anchoring threaded rods, bolts, reinforcing bars, and smooth dowels into solid material.

2.3 MIXES

- A. Anti-desiccant Water Mix: Mix anti-desiccant with water at rates determined by Arborist, based on time of year anti-desiccant will be used.
- B. Backfill Soil Mix for Boxes: 85 percent topsoil by volume, 15 percent organic amendment by volume, 100 pounds of Pure Black Castings per ton of mix, mixed uniformly.
- C. Plant Pit Backfill Mix: Soil excavated from plant pit.

2.4 TREE HOLDING FACILITY

- A. General Requirements:
 - 1. A site within a 50 mile radius of Project Site.
 - 2. A site with public street access suitable for the ingress and egress of tractor trailer trucks and other heavy equipment.
 - 3. A site with an unobstructed delivery route to the Project site for tractor trailers with potentially wide loads.
 - 4. A site with sun and wind exposure conditions similar to the Project site so that the trees may acclimate during the pre-installation period.
 - 5. A site without exposure to significant amounts of dust.
 - 6. An area of sufficient size that allows trees to be spaced apart at a distance that provides enough sun exposure to permit the trees to meet the growth, development, and branching requirements of this Section; that allows storage of ancillary equipment and supplies; and that allows access and maneuverability of necessary vehicles and equipment.
 - 7. Security against theft and vandalism, including a security camera system capable of monitoring the entire facility.
 - 8. A chain-link security fence around the perimeter of the site with lockable gates.
 - 9. A sufficiently flat and firm ground surface to permit access and maneuverability of necessary equipment and vehicles.
 - 10. Sufficient surface drainage to ensure that water does not stand and the soil does not remain muddy for prolonged periods of time.
 - 11. A secure building structure suitable for housing irrigation control equipment and other equipment and supplies.
 - 12. An acceptable water source.
 - 13. An installed irrigation system.
 - 14. Back-up irrigation system, including water stored on site.
 - 15. Operable webcam to allow Owner, Architect, and Arborist to monitor Work progress.
- B. Primary and Back-up Irrigation System Water Sources: Flow rate adequate to irrigate trees and with water of acceptable quality.

- C. Primary Irrigation System: Piped, automatically controlled, and able to withstand year-round weather exposure until trees are transported to Project site.
- D. Back-up Irrigation System:
 - 1. Water source different from water source for primary irrigation system with acceptable water quality, based on water test results.
 - 2. Tank truck capable of preserving the accepted water quality, transporting the water to the holding facility at a rate sufficient to adequately irrigate the trees, and efficiently transferring the water to the drip irrigation bags installed on each tree.
 - 3. A sufficient quantity of drip irrigation bags to install two 20-gallon bags on each 5 to 7-inch caliper tree, three 20-gallon bags on each 7 to 9-inch caliper tree, and four 20-gallon bags on each 9 to 11-inch caliper tree at any time.

2.5 GENERAL PRE-INSTALLATION PREPARATION AND MAINTENANCE REQUIREMENTS

- A. Work Period: Perform Work on trees starting at time of purchase until installation, as described below in this Section.
- B. Work Objectives: Perform Work on trees with the objectives of: Maximizing height growth; maximizing lower branch height; maximizing root mass within root ball area, in order to maximize speed of post-planting recovery and growth, and in order to minimize plant mortality; maintaining and improving branching structure and appearance; improving uniformity in height, spread, and canopy bottom height, and maintaining plants in a healthy, vigorous condition.

2.6 SCHEDULE AND SEQUENCE OF PRE-INSTALLATION PREPARATION AND PRE-INSTALLATION MAINTENANCE WORK

- A. Fall and Winter of Year No. 1 Before Trees are Dug from Ground at Nursery or Other Place of Growth:
 - 1. Collect soil samples from tree root balls, have samples tested, and submit soil test report.
 - 2. The Arborist and Agronomist will develop a custom soil amendment program based on the soil test results with the primary objectives of maximizing height growth, starch accumulation, fibrous root development, and transplantability during the pre-installation period prior to installation at the Project site.
 - 3. Excavate excess soil from the root collars and the top of the root ball area via Air-Spading and prune adventitious, malformed and misdirected roots.
 - 4. Chemically treat competing weeds within the drip line of each tree.
 - 5. If directed by the Arborist, aerate and incorporate organic matter and/or other soil amendments into the soil via Air-Spading to a depth of 24-inches and a distance of 36-inches from the trunk as directed by the Arborist, to encourage increased root mass within the root ball area in lieu of root pruning.
 - 6. Apply fertilizer, biostimulant, mycorrhiza and other soil treatments in early October in accordance with the soil amendment program determined by the Arborist and Agronomist.
 - 7. The Arborist will determine the need for mulching in the nursery or place of growth based on the existing site and growing conditions. If directed, install a 3-inch depth continuous layer of hardwood mulch around trees from 6 inches from the base of the trunk to the drip line.
 - 8. In the late winter, prior to spring bud-swell, prune the trees with the specific objectives of:

- a. Raising the crowns of Base Bid trees to 10 feet clear at trunk or raising the crowns of Alternate No. 1 trees to 8 feet clear at trunk, or as otherwise directed by the Arborist.
 - b. Reducing foliage by 50 percent on branches from 10 feet to 12 feet for Base Bid trees or 8 feet to 9 feet for Alternate No. 1 trees, or as otherwise directed by the Arborist.
 - c. Removing dead, damaged, diseased, or otherwise objectionable branches in a manner that minimizes the loss of foliage in the remaining crown.
 - d. Subordinating or removing codominant or otherwise undesirable branches, as directed by the Arborist.
9. Photographically document the fall color of each sweetgum at peak of fall color to aid in final selection of individual trees to be installed at the Project site.
- B. Spring of Year No. 2:
1. Dig and box the trees prior to bud break in late winter/early spring.
 2. Wrap the trunk of each tree with burlap tree wrap, if directed by the Arborist.
 3. Immediately transport, assemble and secure the trees at the holding facility, as specified, for continued treatment and evaluation for the remaining pre-installation period.
 4. Continually monitor soil moisture and immediately provide irrigation, whenever trees need it.
 5. Perform plant health care monitoring inspections at least once per month and complete pest and disease control, cultural, and other treatments necessary to ensure that the trees are healthy and maintained in accordance with the Work objectives.
 6. Maintain continuous control over weeds within the boxes.
 7. Remain prepared to immediately implement a plan to protect the boxed trees from severe weather (e.g. excessively high soil temperatures, tipping during severe wind, etc.).
 8. Apply fertilizer, biostimulant, mycorrhiza and other soil treatments in March in accordance with the soil amendment program determined by the Arborist and Agronomist.
 9. Install wood chip mulch as necessary to maintain a continuous, loose depth of 3 inches from the box edges to 6 inches away from the root collar.
- C. Summer of Year No. 2:
1. Continually monitor soil moisture and immediately provide irrigation, whenever trees need it.
 2. Perform plant health care monitoring inspections at least once per month and complete pest and disease control, cultural, and other treatments necessary to ensure that the trees are healthy and maintained in accordance with the Work objectives.
 3. Maintain continuous control over weeds within the boxes.
 4. Remain prepared to immediately implement a plan to protect the boxed trees from severe weather (e.g. excessively high soil temperatures, tipping during severe wind, etc.).
 5. If directed by the Arborist, apply anti-desiccant to the trees' foliage in accordance with label rate for "summer transplants", or as otherwise directed by the Arborist.
 6. Collect soil samples from tree root balls in August, have samples tested, and submit soil test report.
 7. The Arborist and Agronomist will develop a custom soil amendment program based on the soil test results with the primary objectives of maximizing height

- growth, starch accumulation, fibrous root development, and transplantability during the pre-installation period prior to installation at the Project site.
8. In the late summer, evaluate, rank and document the comparative size, form, structure, and health of trees for the purpose of making preliminary selections for installation at the Project site and submit preliminary proposed selections to the Architect and Arborist.
- D. Fall and Winter of Year No. 2:
1. Continually monitor soil moisture and immediately provide irrigation, whenever trees need it.
 2. Perform plant health care monitoring inspections at least once per month and complete pest and disease control, cultural, and other treatments necessary to ensure that the trees are healthy and maintained in accordance with the Work objectives.
 3. Maintain continuous control over weeds within the boxes.
 4. Remain prepared to immediately implement a plan to protect the boxed trees from severe weather (e.g. freeze and thaw damage to the root balls, tipping during severe wind).
 5. Photographically document the fall color of each sweetgum at peak of fall color to aid in final selection of individual trees to be installed at the Project site.
 6. Apply fertilizer, biostimulant, mycorrhiza and other soil treatments in early October in accordance with the soil amendment program determined by the Arborist and Agronomist.
 7. Implement applicable winterization measures.
 8. In the late winter, prior to spring bud-swell, prune the trees with the specific objectives of:
 - a. Raising crowns of Base Bid trees to 10 to 13 feet clear at trunk, or raising crowns of Alternate No. 1 trees to 8.5 to 10 feet clear at trunk, or as otherwise directed by the Arborist (Arborist will require crowns to be raised higher if rate of growth permits).
 - b. Removing dead, damaged, diseased, crossing and conflicting, poorly spaced, or otherwise objectionable branches in a manner that minimizes the loss of foliage in the remaining crown.
 - c. Removing or continuing to subordinate codominant or otherwise undesirable branches, as directed by the Arborist.
- E. Spring of Year No. 3:
1. Continually monitor soil moisture and immediately provide irrigation, whenever trees need it.
 2. Perform plant health care monitoring inspections at least once per month and complete pest and disease control, cultural, and other treatments necessary to ensure that the trees are healthy and maintained in accordance with the Work objectives.
 3. Maintain continuous control over weeds within the boxes.
 4. Remain prepared to immediately implement a plan to protect the boxed trees from severe weather (e.g. excessively high soil temperatures, tipping during severe wind, etc.).
 5. Remove excess soil from the root collars and the top of the root balls via Air-Spading and prune adventitious, malformed and misdirected roots, as necessary.
 6. Apply fertilizer, biostimulant, mycorrhiza and other soil treatments in March in accordance with the soil amendment program determined by the Arborist and Agronomist.
 7. Install wood chip mulch as necessary to maintain a continuous, loose depth of 3-inches from the box edges to 6-inches away from the root collar.

8. Turn boxed trees in place 90 degrees clockwise, if required by the Arborist, to facilitate symmetrical growth and acclimation.
 9. Re-tension guy straps on the trees as directed by the Arborist.
- F. Summer of Year No. 3:
1. Continually monitor soil moisture and immediately provide irrigation, whenever trees need it.
 2. Perform plant health care monitoring inspections at least once per month and complete pest and disease control, cultural, and other treatments necessary to ensure that the trees are healthy and maintained in accordance with the Work objectives.
 3. Maintain continuous control over weeds within the boxes.
 4. Remain prepared to immediately implement a plan to protect the boxed trees from severe weather (e.g. excessively high soil temperatures, tipping during severe wind, etc.).
 5. Collect soil samples from tree root balls in August, have samples tested, and submit soil test report.
 6. The Arborist and Agronomist will develop a custom soil amendment program based on the soil test results with the primary objectives of maximizing height growth, starch accumulation, fibrous root development, and transplantability during the pre-installation period prior to installation at the Project site.
 7. In the late summer, reevaluate and rank the size, form, structure, and health of trees and submit final proposed selections for installation at the Project site.
- G. Fall and Winter of Year No. 3:
1. Continually monitor soil moisture and immediately provide irrigation, whenever trees need it.
 2. Perform plant health care monitoring inspections at least once per month and complete pest and disease control, cultural, and other treatments necessary to ensure that the trees are healthy and maintained in accordance with the Work objectives.
 3. Maintain continuous control over weeds within the boxes.
 4. Remain prepared to immediately implement a plan to protect the boxed trees from severe weather (e.g. freeze and thaw damage to the root balls, tipping during severe wind).
 5. Photographically document the fall color of each sweetgum at peak of fall color to aid in final selection of individual trees to be installed at the project site.
 6. Apply fertilizer, biostimulant, mycorrhiza and other soil treatments in early October in accordance with the soil amendment program determined by the Arborist and Agronomist.
 7. Implement applicable winterization measures.
- H. Spring of Year No. 4 of Extra Trees Only:
1. Continually monitor soil moisture and immediately provide irrigation, whenever trees need it.
 2. Perform plant health care monitoring inspections at least once per month and complete pest and disease control, cultural, and other treatments necessary to ensure that the trees are healthy and maintained in accordance with the Work objectives.
 3. Maintain continuous control over weeds within the boxes.
 4. Remain prepared to immediately implement a plan to protect the boxed trees from severe weather (e.g. excessively high soil temperatures, tipping during severe wind, etc.).

5. Apply fertilizer, biostimulant, mycorrhiza and other soil treatments in March in accordance with the soil amendment program determined by the Arborist and Agronomist.
 6. Install wood chip mulch as necessary to maintain a continuous, loose depth of 3 inches from the box edges to 6 inches away from the root collar.
 7. Turn boxed trees in place 90 degrees clockwise, if required by the Arborist, to facilitate symmetrical growth and acclimation.
 8. Re-tension guy straps on the trees as directed by the Arborist.
- I. Summer of Year No. 4 of Extra Trees Only:
1. Continually monitor soil moisture and immediately provide irrigation, whenever trees need it.
 2. Perform plant health care monitoring inspections at least once per month and complete pest and disease control, cultural, and other treatments necessary to ensure that the trees are healthy and maintained in accordance with the Work objectives.
 3. Maintain continuous control over weeds within the boxes.
 4. Remain prepared to immediately implement a plan to protect the boxed trees from severe weather (e.g. excessively high soil temperatures, tipping during severe wind, etc.).
 5. Collect soil samples from tree root balls in August, have samples tested, and submit soil test report.
 6. The Arborist and Agronomist will develop a custom soil amendment program based on the soil test results with the primary objectives of maximizing height growth, starch accumulation, fibrous root development, and transplantability during the pre-installation period prior to installation at the Project site.
- J. Fall and Winter of Year No. 4 of Extra Trees Only:
1. Continually monitor soil moisture and immediately provide irrigation, whenever trees need it.
 2. Perform plant health care monitoring inspections at least once per month and complete pest and disease control, cultural, and other treatments necessary to ensure that the trees are healthy and maintained in accordance with the Work objectives.
 3. Maintain continuous control over weeds within the boxes.
 4. Remain prepared to immediately implement a plan to protect the boxed trees from severe weather (e.g. freeze and thaw damage to the root balls, tipping during severe wind).
 5. Photographically document the fall color of each sweetgum at peak of fall color to aid in final selection of individual trees to be installed at the project site.
 6. Apply fertilizer, biostimulant, mycorrhiza and other soil treatments in early October in accordance with the soil amendment program determined by the Arborist and Agronomist.
 7. Implement applicable winterization measures.

2.7 PEST AND DISEASE CONTROL

- A. General:
1. Employ principles of IPM in the selection of preventative and control measures for plant pests and diseases.
 2. Insignificant pests will be tolerated providing they do not seriously threaten planting health and appearance unless directed otherwise by the Arborist.
 3. Monitor the site closely and take timely action to address problems identified.
 4. Employ a certified commercial pesticide applicator to apply pesticides.

5. Use pesticides approved by the EPA that conform to applicable laws, codes and regulations.
 6. When necessary apply the least toxic pesticide required for the existing problem, unless directed otherwise by the Arborist.
 7. Apply pesticide only if a pest or disease is a serious threat and cease application after problem is under control, unless directed otherwise by the Arborist.
 8. Spray with extreme care to avoid hazards to any person, animal, automobile, or sensitive environment in the area or adjacent areas.
 9. Meet requirements of pesticide manufacturer's current printed label and application instructions.
 10. The Contractor shall be held liable for plant damage due to the use of pesticides.
- B. Plant Condition Inspection:
1. Inspect plant material weekly for damage and signs of stress, pests, and disease.
 2. Submit a written and photographic inspection report of observed damage, and signs of stress, pests, or disease via e-mail to the Owner, the Architect, and Arborist within 48 hours of observations.
 3. Use a digital camera with at least 5.0 megapixels of resolution to document observations.
- C. Pesticide Application:
1. When necessary apply the least toxic pesticide required for the existing problem.
 2. Meet requirements of manufacturer's current printed instructions.
 3. Apply sprays only if a pest or disease is a serious threat and cease application after problem is under control.
 4. Make spray applications in early morning hours, prior to 7:00 A.M., unless approved otherwise by Owner and Arborist.
- 2.8 REQUIREMENTS FOR SPECIFIC PRE-INSTALLATION PREPARATION AND PRE-INSTALLATION MAINTENANCE WORK
- A. Soil Moisture Monitoring:
1. Monitor and record soil moisture levels of root balls and surrounding soil or backfill soil mix at least once per week or as often as required to provide optimum moisture to the root balls.
 2. Monitor soil moisture with a soil sampling tube and properly calibrated and maintained soil moisture sensor probes inserted into access tubes.
 3. Check moisture at representative trees at 6-inch, 18-inch, and 30-inch depths.
 4. Record readings at each depth and weekly submit readings as part of the maintenance log required in this Section.
- B. Root Collar Excavation:
1. Excavate excess soil, mulch and other debris from the root collars and the top of the root balls of all trees via air-spading in fall of Year No. 1 and again in spring of Year No. 3.
 2. Air-excavate and remove soil to the extent that the root collar is exposed at and above-grade level and the first primary roots are within 1 inch of the root ball surface.
 3. Remove any adventitious, malformed and misdirected roots at this time.
- C. Mulching: For boxed trees, apply and maintain a continuous layer of wood chip mulch at a loose depth of 3-inches from the box edges to 6 inches away from the root collar.

- D. Irrigation:
1. Apply accepted irrigation water on an as-needed (versus automatic timed) basis, as determined by continual soil moisture monitoring.
 2. When necessary, unless otherwise directed by the Arborist, apply irrigation water so that the equivalent of 1 inch of water is evenly distributed over the area under the drip line in a single application.
 3. Make subsequent applications only after excess free water has sufficiently drained to permit re-oxygenation of the soil and to avoid excessive wetness.
- E. Soil Amendment Applications:
1. To establish a bid price, assume fertilizer, biostimulant, mycorrhiza treatments, and other soil treatments indicated in the Preliminary Pesticide Application Schedule in Part 3 of this Section.
 2. For actual application, apply the specific products as specified in the soil amendment program determined by the Arborist and Agronomist.
- F. Tree Pruning:
1. Perform pruning under the direct supervision of the Arborist.
 2. Perform pruning in strict accordance with ANSI A300, Part 1, Article 5.7.1 Young Trees, unless directed otherwise by the Arborist.
 3. Perform the following pruning only when directed by the Arborist:
 - a. Removal of dead, broken, conflicting, interfering, or otherwise objectionable branches.
 - b. Removal of basal suckers and excessive water sprouts.
 - c. Crown reduction to improve consistency in height between the trees.
 - d. Shaping to improve consistency in form between the trees.
- G. Anti-Desiccant Treatments:
1. Treat trees with an anti-desiccant spray to reduce moisture stress at the time of digging and boxing and following installation on site.
 2. Make additional anti-desiccant applications if required by the Arborist.
- H. Root Drench Borer Treatment:
1. Treat swamp white oaks with Imidacioprid in October, prior to digging and boxing trees the following spring, and at time of planting at the Project site, to help protect against stress-related infestations of flat-headed borers.
 2. Make additional applications if required by the Arborist.
 3. Make applications via soil drench in the root ball area in strict accordance with label instructions and per-caliper-inch dosage rates.
- I. Weed Control:
1. Control weeds within the drip line of trees growing in the ground and the entire soil surface of boxed trees as frequently as necessary.
 2. Acceptable methods of weed control shall include mowing, hand-pulling and/or applications of Round-Up in strict accordance with label instructions and in a manner that will avoid damage or stress to the trees.
 3. Do not apply other pre-emergent or post-emergent herbicides.
 4. Do not use invasive methods of mechanical control that may be injurious to tree roots, such as tilling, without the Arborist's acceptance.
- J. Winterization of Boxed Trees:
1. After the first hard frost, insulate the tree boxes against rapid freeze and thaw cycles by stacking bales of straw or salt hay on all four sides of the box, from the

- ground to the top of the box, and secure the bales in place with baling wire or metal straps.
 2. Maintain and replace the bales as necessary throughout the winter.
 3. Remove and dispose of the bales between March 10 and March 21, or unless directed otherwise by the Arborist.
- K. Tree Wrapping:
1. Wrap trees only when required by the Arborist to prevent desiccation and sun scald injury.
 2. Install tree wrap in a spiral fashion around the trunk from base to above the first prominent branches with a 1-inch overlap and secure the loose ends at the top and bottom with weather-proof tape or stitching.
 3. Do not use fasteners that penetrate the bark.
 4. Maintain or replace the tree wrap as necessary to ensure its effectiveness.
 5. Remove tree wrap materials when directed by the Arborist.
- L. Tree Digging and Options for Transport to Holding Facility:
1. Dig trees from the place of growth while still dormant in early to mid March.
 2. Tie up the trees' crowns with sisal twine prior to digging to minimize interference and injury and to permit transportation.
 3. Tie the crowns no more than two days prior to digging.
 4. Take extreme care to prevent over-bending the branches to the point of injury or permanent bending.
 5. Protect the branches with wraps of burlap under the twine to prevent injury to bark.
 6. If soil moisture levels warrant, thoroughly irrigate the trees two days prior to digging.
 7. Prior to digging, mark the north side of the trunk with a small paint dot approximately 24 inches from the base.
 8. Dig trees with 90-inch diameter root balls.
 9. Dig trees so that the trunks are well centered within the root ball.
 10. Dig trees from the ground via truck-mounted tree spade and transfer directly to wooden boxes, or transport trees via tree spade to holding facility and box immediately upon arrival at the holding facility, or transfer trees from the tree spade to burlap-lined wire baskets and box immediately upon arrival at the tree holding facility.
 11. Drum-lace root balls placed in wire baskets to hold the soil in a firm, stable condition prior to loading and transport to the holding facility.
 12. At the time of boxing, remove burlap, twine, wire baskets, and other materials used in the balling and burlapping process.
- M. Tree Boxing Procedures:
1. Construct heavy-duty boxes from wood boards and steel strapping, in accordance with current industry standards.
 2. Construct boxes with inside dimensions of 120 inches long by 90 inches wide by 48 inches deep, except for Owner-supplied trees.
 3. For Owner-supplied trees, construct boxes with inside dimensions of 120 inches by 120 inches by 48 inches deep.
 4. Prior to installing backfill mix or trees, uniformly coat the inside vertical surfaces and bottom surfaces of the boxes with root growth regulator, in accordance with the manufacturer's current printed instructions.
 5. Set sweetgum trees and 357 swamp white oak trees in boxes with top of root balls 42 inches above bottom of box after settlement, with trunk centered in box.

6. Set 54 swamp white oaks in boxes with top of root balls 36 inches above bottom of box after settlement, with trunk centered in box.
 7. Immediately after setting each root ball into box, backfill around root ball to top of root ball, without covering root ball with backfill soil mix.
 8. Secure the trees in the boxes with four guy straps looped around the trunk and over strong branch crotches in the lower one-third of the crown and secure straps to eyebolts firmly mounted in the corner frames of the boxes.
 9. Gradually and alternately tension the guy straps in a manner that ensures that the trees are plumb within the boxes.
 10. Immediately after backfilling and guying the trees in the boxes, fully saturate the soil with water and add additional backfill soil mix, if necessary, to compensate for settling.
 11. Upon completion of box installation, make a larger paint mark on the side of each box corresponding to the north side of each tree.
 12. In 100 of the boxes, install one moisture sensor probe access tube half way between trunk and box end, in accordance with the manufacturer's current printed installation instructions.
- N. Preparation of Trees for Transport, Transport, and Delivery of Trees from the Place of Growth to Tree Holding Facility:
1. Prior to transport, securely cap boxes with wood sheathing in a manner that ensures the soil mix and root balls are held firmly in place during transport.
 2. Utilize methods of lifting, handling, loading, transport, and unloading that prevent injury to the trees, damage to the boxes, and disruption or loss of soil from the boxes.
 3. Transport trees from the place of growth to the holding facility as soon after digging as possible and before spring bud swell.
 4. Treat trees with an anti-desiccant spray applied to the trunk, branches and twigs no more than 72 hours and no less than 24 hours prior to transport.
 5. Thoroughly irrigate trees no more than 12 hours prior to shipping.
 6. Once loaded onto the transport vehicle, cover trees with a securely fastened, open-weave shade tarp that minimizes desiccation while permitting sufficient cool air flow.
 7. If trees must be transported while in leaf, make shipments during the night or early morning hours to minimize desiccation, unless otherwise accepted by the Arborist.
 8. Off load the trees immediately upon arrival at the holding facility and place at the designated locations.
 9. Remove the wood box caps and irrigate the trees again immediately upon being placed at the designated locations, or sooner in the event of a delay in placing the trees at designated locations.
 10. Install wood chip mulch over surface of soil in boxes within 72 hours of delivery.
- O. Preparation of Trees for Transport to Project Site:
1. Treat trees with an anti-desiccant spray applied to the trunk, branches and twigs no more than 72 hours and no less than 24 hours prior to transport.
 2. Thoroughly irrigate trees no more than 12 hours prior to shipping.
- P. Lifting, Handling, Transport, and Delivery of Trees to Site: Meet requirements in Part 1 of this Section.
- 2.9 MAINTENANCE OF PRIMARY IRRIGATION SYSTEM AT HOLDING AREA
- A. Damages: Perform repairs before next irrigation cycle commences.

- B. Cleaning and Monitoring the System:
1. Continually monitor the irrigation systems to verify that they are functioning properly as designed.
 2. Clean filters and strainers at least once a month and as often as necessary to keep the irrigation systems free of sand and other debris.
 3. Set and continuously adjust and program automatic controller for changing water requirements.
 4. Make program adjustments as required by changing weather and soil conditions.
 5. Record in writing the daily watering times set for each remote control valve and weekly submit times as part of the maintenance log required by this Section.
- C. Winterization: Prior to first freeze, drain irrigation system in the fall of the first year after installation and restart system in the following spring.

2.10 SOURCE QUALITY CONTROL

- A. Plant Material Review and Tagging by Architect and Arborist:
1. Architect and Arborist will review, photograph, and tag at the nursery, or other place of growth prior to root pruning, using metal lock-seal tags with serial numbers.
 2. Tagging of plant material at the nursery or place of growth does not affect the right of the Architect or Arborist to reject plant material at the Project site, if damage or unacceptable conditions are found that were not detected at the places of growth and maintenance or if damage occurs during transport.
- B. Irrigation Water Source Testing:
1. Collect a 1-quart size water sample in a clean, glass container from the proposed water sources for primary irrigation system and for back-up irrigation system.
 2. Send water samples to A&L Eastern Agricultural Laboratories in Richmond, VA, and employ laboratory to perform the A&L Basic Test No. W2 for sodium, calcium, magnesium, chloride, conductivity, sulfate, nitrate, pH, carbonate, bicarbonate, phosphorous, potassium, boron, total dissolved solids and sodium absorption rate.
 3. Within 14 days of award of contract, submit to the Owner's Representative, Architect, Arborist, and Agronomist the laboratory's written test report for their evaluation and formulation of corrective treatments that may be necessary if the water does not meet the specified requirements.
 4. Collect samples and have water tested from each source once per month in April, May, June, July, and August of each year.
- C. Procedure for Sampling and Testing of Soil at Tree Places of Growth and Holding Area:
1. Collect soil with clean, stainless steel implements and place it in clean plastic bags or soil sampling bags to prevent contamination.
 2. Collect soil samples from places of growth and holding area in a manner and in whatever quantity necessary to ensure that the samples are representative of "average" growing conditions at each location.
 3. Within each location, identify different areas based on site conditions, such as visible differences in soil, slope, drainage, differences in tree growth rates, differences in groundcover vegetation, and prepare a separate composite sample for each area.
 4. Collect soil at a depth of 6 to 12 inches from various points between the trunk and two-feet beyond the drip line from several trees within the area.
 5. Blend the soil to create a composite sample that represents average conditions within the area.

6. Send soil samples to A&L Eastern Agricultural Laboratories in Richmond, VA and employ laboratory to perform the: 1) A&L Standard Test 1A for organic matter, estimated nitrogen release, phosphorous P1 and P2, potassium, magnesium, calcium, pH, buffer pH, hydrogen, exchange capacity, and percent base saturation; 2) A&L Test 2 for soluble salts, excess lime and sodium; and 3) the A&L Test 3 for sulfur, boron, zinc, manganese, iron, and copper.
 7. At least 21 days prior to each scheduled amendment application, submit to the Architect, Agronomist, and Arborist the laboratory's written soil test report, including the laboratory's soil test data; the laboratory's interpretation of nutritional deficiencies, excesses, and potential toxicities; the laboratory's amendment recommendations; and the laboratory's maintenance recommendations.
 8. The Architect, the Agronomist, and the Arborist will determine the soil amendment programs based on the soil test report which may differ from the soil test report recommendations.
- D. Soil Tests to Verify Chemical and Physical Characteristics of Topsoil:
1. Take representative samples from at least 5 locations at topsoil source.
 2. Collect soil with clean, stainless steel implements and place it in clean plastic bags or soil sampling bags to prevent contamination.
 3. Collect soil samples in a manner and in whatever quantity necessary to ensure that the samples are representative of topsoil.
 4. Send samples to A&L Easter Agricultural Laboratories in Richmond, VA.
 5. Employ the laboratory to test the soil samples for the following:
 - a. pH measurement in the saturation extract per USDA Handbook No. 60, Method 21.
 - b. Electrical conductivity of the saturation extract per USDA Handbook No. 60, Method 2.
 - c. Sodium absorption ratio of the saturation extract per USDA Handbook No. 60, Method 20b.
 - d. Determination of boron, calcium, copper, iron, magnesium, manganese, molybdenum, phosphorous, potassium, sodium, sulfur, and zinc, via the following test methods: Mehlich Number 3, Bray P1, Bray P2, Olsen P, DTPA, ammonium acetate, ammonium bicarbonate DTPA, and hot water extract from boron.
 - e. Analysis of saturation extract for calcium, magnesium, sodium, boron, chloride, phosphorous, nitrate, and sulfate.
 - f. Measurement of following trace metals by the DTPA extract: aluminum, arsenic, cadmium, chromium, cobalt, lead, lithium, nickel, selenium, silver, strontium, tin, and vanadium.
 - g. Presence of calcium carbonate and magnesium carbonate.
 - h. Estimate of soil texture per commonly used methods.
 - i. Estimate of organic matter content per commonly used methods.
 - j. Exchangeable Ammonium cation.
 - k. Base Saturation.
 - l. Cation Exchange Capacity.
 - m. Carbonates Determination.
 - n. Soil Bulk Density.
 - o. Water Infiltration Rate per USDA Handbook No. 60, Method 34b.
 6. Submit laboratory's test report to the Architect, Agronomist, and Arborist.
- E. Testing to Verify Organic Amendment Properties:
1. Send representative sample to A&L Easter Agricultural Laboratories in Richmond, VA.

2. Employ the laboratory to test for the specified properties.
 3. Submit laboratory's test report to Architect, Agronomist, and Arborist.
- F. Reviews of Pre-installation Preparation Work and Maintenance Work by Architect and Arborist:
1. Have supervising personnel be present during reviews by the Architect and Arborist.
 2. Architect will periodically review trees with the Arborist at least 3 times per year, once in Spring, after trees have fully leafed out, once in Fall at the height of Fall color, and once after the leaves have dropped.
 3. Prior to the loading and transport of trees to the Project site, the Landscape Architect will review trees with the Arborist to make final selection of trees to be installed at the Project site.
- G. Reviews of Pre-installation Preparation Work and Maintenance Work by Arborist:
1. Have supervisory personnel present during reviews by the Arborist.
 2. Keep Arborist updated on precise schedule for root-pruning and canopy pruning Work and coordinate this Work with the Arborist's availability.
 3. In addition to the reviews with the Architect, the Arborist will review trees twice monthly to review progress of growth and to check for signs of stress.
 4. The Arborist will also be present to provide instruction for root-pruning and canopy pruning Work, and to monitor root-pruning and canopy pruning Work.

PART 3 — EXECUTION

3.1 EXAMINATION

- A. Verification of Site Conditions:
1. Verify soil mixes have been installed.
 2. Verify that the structural planting soil mix under the root ball has been installed to the correct elevations.
 3. Verify that the deadman assemblies, eyebolts, and anchor cables for the root ball anchor systems have been installed before installing trees.
 4. Verify that stone slab pavers have been installed.
 5. Verify that irrigation system has been installed and has been tested, adjusted, and is operating correctly.

3.2 PREPARATION

- A. Protection of Existing Conditions:
1. Use every possible precaution to prevent damage to existing conditions to remain such as structures, utilities, plant materials and paving on or adjacent to the site of the Work.
 2. Provide protective mats, barricades, fences or other barriers to protect existing conditions to remain from damage during construction.
 3. Use every possible precaution to prevent excessive compaction of planting area soil and soil mixes within or adjacent to the areas of Work.
 4. Do not store materials or equipment, permit burning, or operate or park equipment under the branches of existing plants to remain.
 5. Submit written notification of damaged existing conditions the Owner's Representative immediately.

3.3 TREE INSTALLATION

- A. Plant Pit Excavation:
1. Excavate plant pits to a depth equal to the root ball height minus the amount needed to allow for settlement and to install the root balls at the elevation indicated on the Drawings.
 2. Excavate pits to size indicated on the Drawings.
 3. At lawn and ground cover areas, install top of plant root balls 1 inch above adjacent finished grade, or higher, if required to allow for settlement, except where indicated otherwise.
- B. Protection of Trees On-site Prior to Installation:
1. Protect tree root balls from sun or drying winds.
 2. Keep root balls of plants that cannot be planted immediately upon delivery in the shade, well-protected and well-watered.
- C. Tree Placement:
1. Handling tree carefully, set box on top of structural planting soil mix cone at pit bottom.
 2. Where tree root balls will be covered by paving, install box vertically so that top of root ball is at the elevation indicated on the Drawings.
 3. At lawn and ground cover areas, install top of plant root balls 1 inch above adjacent finished grade, or higher, if required to allow for settlement, except where indicated otherwise.
 4. Adjust bottom of pit elevation as required by adding or removing structural planting soil mix.
- D. Removal of Box Materials:
1. Remove and dispose of box sides, burlap, nylon cord, wire, twine, and other materials prior to backfilling.
 2. Do not remove box bottom.
- E. Root Ball Scarification:
1. After removing box sides, scarify sides of root ball to prevent root-bound condition.
 2. Loosen root ball soil surface to depth of 1/8-inch to 1/4-inch without damaging roots or breaking root ball.
- F. Circling Roots:
1. Progressively comb-out and position circling roots.
 2. If circling roots are encountered at root ball sides that cannot be combed out, notify the Arborist for field review.
 3. If acceptable to the Arborist, cut roots on 4 sides of root ball 90 degrees apart at no additional cost to the Owner.
 4. Use a 4-inch wide sharp straight blade.
 5. Cut roots by pushing spade or knife down sides of root ball 90 degrees to root ball surface and 2 inches into root ball.
 6. Keep spade or knife sharp to cut roots cleanly.
- G. Root Biostimulant: Apply mychoriza to root ball and surrounding backfill mix.

- H. Backfill Mix Placement:
 - 1. Place mix carefully as not to damage the plant root ball, trunk, branches, or foliage.
 - 2. Fill pit until top of backfill mix is even with top of root ball.

- I. Backfill Mix Settlement:
 - 1. Settle backfill mix by watering evenly.
 - 2. Fill settled backfill mix areas with additional backfill mix as required to bring it even with top of root ball, drench added backfill mix with water.
 - 3. Continue filling settled areas and drenching with water until settlement stops.

- J. Root Ball Anchor Systems at Zone 1 and 4 Trees:
 - 1. Install eyebolts in reinforced concrete slab where indicated on the Drawings, before the structural planting soil is installed.
 - 2. Drill holes in concrete to diameter recommended by the adhesive manufacturer and to a 4-inch depth.
 - 3. Do not drill holes deeper than 4 inches, so that waterproof membrane below is not damaged.
 - 4. Anchor eyebolts in drilled holes with adhesive.
 - 5. After adhesive has cured, thread one anchor cable segment halfway through each eyebolt and temporarily attach ends of anchor cables to edge of tree well opening in paving above, so that cables extend vertically from eyebolts to edge of tree well opening above, and are accessible to install on top of the root balls after the trees are installed.
 - 6. Attach cable ends securely enough to edge of tree well openings, so that they are not easily displaced during installation of soil mixes and trees.
 - 7. After trees are installed, install root ball stabilizer boards, anchor cables, and cable tensioners on top of root balls, as indicated on the Drawings.
 - 8. Where indicated on Drawings, connect cable segment ends together using four wire rope clips and two thimbles.
 - 9. At cable tensioners, connect one cable end to hole in the end of the cable tensioner opposite the drum using two wire rope clips and one thimble, and connect one cable end to tensioner drum, in accordance with the tensioner manufacturer's current printed instructions.
 - 10. After root ball anchor system materials are installed, apply enough tension to cables to keep the root balls from moving during high winds, and mark ratchet position for future reference.

- K. Root Ball Anchor Systems at Zone 2 and 3 Trees:
 - 1. Install deadman assemblies and anchor cables before structural planting soil mix is installed.
 - 2. After each deadman assembly is installed, thread one anchor cable segment halfway through each deadman assembly eyebolt.
 - 3. Lay cable ends toward the center of the deadman assembly, to dig up later, for use when tree pit is excavated.
 - 4. After trees are installed, install root ball stabilizer boards, anchor cables, and cable tensioners on top of root balls, as indicated above for Zone 1 and 4 trees.

- L. Cable End Connections with Wire Rope Clips and Thimbles:
 - 1. Install each cable end around a thimble with 6 inches of turnback.
 - 2. Install two clips on each turnback, one clip as close as possible to thimble, and the other clip 1-inch clear from the cable turnback end.
 - 3. Install U-bolt part of each clip on turnback part of cable and install the saddle part of each clip on long end of cable.

4. Apply the amount of torque to tighten nuts, as designated by the clip manufacturer's current printed instructions.
 5. When tensioning cables, do not exceed maximum wrench torque recommended by tensioner manufacturer.
- M. Anti-desiccant: Apply anti-desiccant to foliage of each tree after backfilling of each root ball is complete, as directed by the Arborist.
- N. Borer Protection: Apply Imidacloprid drench to each root ball after backfilling of each root ball is complete.

3.4 WATERING BASINS

- A. Dikes: Using soil excavated from plant pit, form a 4-inch high continuous soil dike ring at outside perimeter of each root ball to form a watering basin.
- B. Wood Chip Mulch:
1. Install a 3-inch deep layer of mulch over ground surface and root ball surface, inside each dike ring.
 2. Rake mulch surface smooth.
 3. Hold and slope mulch away from trunks so that mulch does not touch trunks.

3.5 FIELD QUALITY CONTROL

- A. Field Reviews by the Architect:
1. Have supervisory personnel present during entire walkthrough by the Architect, when requested by the Architect.
 2. Keep the Architect updated on precise Work schedule.
 3. The Architect will review installation Work frequently to check for compliance with the Contract Documents.
- B. Field Reviews by the Arborist:
1. Have supervisory personnel present during reviews.
 2. Keep the Arborist updated on precise Work schedule.
 3. The Arborist will review installation Work weekly or more frequently to check stress, damage, and for compliance with the Contract Documents.

3.6 PROTECTION

- A. Excessive Compaction of Soil Mixes and Root Balls:
1. Protect planting soil mix, plant pit backfill soil mix, and tree root balls from excessive compaction.
 2. Do not allow pedestrian, vehicular, or equipment traffic on planting soil mixes and root balls.
 3. Do not allow storage of materials on planting soil mix, plant pit backfill soil mix, and root balls.
- B. Protection Fencing for Trees:
1. Install chain-link fencing at the perimeter of tree protection zones if required to keep construction traffic out of the protection zones, so that trunks are protected from the ground to the lowest limbs.
 2. Install posts at minimum 8 feet on-center.
 3. Attach chain-link mesh to post with wire clips located at 12 inches on-center.

4. Do not remove or modify protection fence without acceptance from the Architect or Arborist.
 5. Do not allow people or equipment within tree protection zones without acceptance from the Architect or Arborist.
- C. Interim Removal and Replacement of Protection Fence to Facilitate Work within the Tree Protection Zones:
1. Wrap snow fence 3 to 4 times around tree trunks located within tree-protection zones where Work is to occur within tree protection zones.
 2. Wrap plastic barrier fencing around branches overhanging areas where Work is to occur within tree-protection zones.
 3. Remove snow fence and plastic barrier fencing and replace protection fence as soon as Work is complete.
- D. Restrictions: Do not allow the following operations within the tree-protection zones:
1. Parking of vehicles or equipment.
 2. Storage of materials, signs, tools, refuse.
 3. Use of trees as support posts, power poles, sign posts or other functions.
 4. Dumping of toxic materials such as paint, petroleum products, non-potable water, and other deleterious materials.
 5. Excessive water or heat from construction equipment or burning of trash under or near trees.
 6. Excessive water, exhausts or drying resulting from dewatering or other operations.
 7. Branch pruning.
 8. Foot, vehicle, and equipment traffic.
- E. Dust Control:
1. Maintain dust control to keep dust occurrence at a bare minimum.
 2. Remove dust from the surfaces of foliage existing plants to remain within the project area and adjacent to it via spraying with water as often as is required by the Arborist.

3.7 SCHEDULES

A. Preliminary Pesticide Application Schedule to Establish Bid Price:

<i>Pesticide:</i>	<i>Tree Type:</i>	<i>Total Applications Per Tree:</i>	
		<i>Zone 1, 2, 3, 4:</i>	<i>Extra Trees:</i>
Imidacloprid Soil Drench:	Swamp White Oak	2	2
	Sweetgum	0	0
Anti-desiccant:	Swamp White Oak	4	4
	Sweetgum	4	4
Horticultural Oil:	Swamp White Oak	2	2
	Sweetgum	0	0
Fungicide:	Swamp White Oak	6	9
	Sweetgum	0	0

<i>Pesticide:</i>	<i>Tree Type:</i>	<i>Total Applications Per Tree:</i>	
		<i>Zone 1, 2, 3, 4:</i>	<i>Extra Trees:</i>
Miticide:	Swamp White Oak	2	3
	Sweetgum	0	0
Insecticide (general foliar spray):	Swamp White Oak	2	3
	Sweetgum	2	3
Insecticide (contact for scale):	Swamp White Oak	2	3
	Sweetgum	0	0
Herbicide on Ground at Place of Growth, Prior to Boxing:	Swamp White Oak	1	1
	Sweetgum	1	1
Herbicide on Surface of Backfill Mix and Root Balls in Boxes:	Swamp White Oak	2 years on ongoing basis	3 years on ongoing basis
	Sweetgum	2 years on ongoing basis	3 years on ongoing basis

B. Preliminary Soil Amendment Application Schedule to Establish Bid Price:

<i>Soil Amendment:</i>	<i>Tree Type:</i>	<i>Total Applications Per Tree:</i>	
		<i>Zone 1, 2, 3, 4:</i>	<i>Extra Trees:</i>
N-P-K plus Micronutrients:	Swamp White Oak	5	7
	Sweetgum	5	7
Mycorrhizae:	Swamp White Oak	3	4
	Sweetgum	3	4
Biostimulant:	Swamp White Oak	3	4
	Sweetgum	3	4

C. Preliminary Schedule of Other Treatments to Establish Bid Price:

<i>Treatment:</i>	<i>Tree Type:</i>	<i>Total Treatments Per Tree:</i>	
		<i>Zone 1, 2, 3, 4:</i>	<i>Extra Trees:</i>
Air Spade Root Collar Excavation:	Swamp White Oak	2	2
	Sweetgum	2	2

<i>Treatment:</i>	<i>Tree Type:</i>	<i>Total Treatments Per Tree:</i>	
		<i>Zone 1, 2, 3, 4:</i>	<i>Extra Trees:</i>
Air Spade Root Zone Aeration	Swamp White Oak	1	1
	Sweetgum	1	1
Mulching in Boxes:	Swamp White Oak	2	3
	Sweetgum	2	3
Initial Pruning in Year 1:	Swamp White Oak	1	1
	Sweetgum	1	1
Second Pruning in Year 2:	Swamp White Oak	1	1
	Sweetgum	1	1
Winterization of Boxed Trees:	Swamp White Oak	2	3
	Sweetgum	2	3
Tree Wrap:	Swamp White Oak	2	2
	Sweetgum	2	2

END OF SECTION

SECTION 02936

LANDSCAPE MAINTENANCE PERIOD FOR TREES

PART 1 — GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Monitoring and Maintenance of Trees after Installation at Project Site.
 - 2. Monitoring and Maintenance of Irrigation System Installed at Project Site.
 - 3. Maintenance of Wood Chip Mulch.

- B. Related Sections:
 - 1. Section 02810, Irrigation (to be issued later with WTC Memorial Landscape Drawings).
 - 2. Section 02910, Planting Soil Preparation (to be issued later with WTC Memorial Landscape Drawings).
 - 3. Section 02930, Planting Materials (to be issued later with WTC Memorial Landscape Drawings).
 - 4. Section 02931, Trees.
 - 5. Section 02935, Landscape Maintenance Period (to be issued later with WTC Memorial Landscape Drawings).

- C. Unit Prices:
 - 1. Provide a unit price for each pesticide application indicated in the Preliminary Pesticide Application Schedule under Article 3.9 in this Section to establish a bid price.
 - 2. Provide a unit price for each soil amendment application, indicated in the Preliminary Soil Amendment Application Schedule, under Article 3.9 in this Section, to establish a bid price.
 - 3. Unit prices shall be applicable for the cost of additional pesticide and soil amendment applications required beyond the quantity of applications included in the bid and shall be applicable for crediting the Owner for applications included in the bid price which are not required by the Arborist.
 - 4. Credit Owner for any pesticide or soil amendment applications included in the bid price which are not required by the Arborist.

- D. Alternates: Maintain smaller Alternate No. 1 trees as indicated in this Section.

1.2 REFERENCES

- A. ANSI — American National Standards Institute:
 - 1. A 300 — Trees, Shrubs, and Other Woody Plant Maintenance — Standard Practice.
 - 2. Z 60.1 — American Standard for Nursery Stock.
 - 3. Z 133.1 — Pruning, Repairing, Maintaining, and Removing Trees, and Cutting Brush — Safety Requirements.

- B. ASTM — ASTM International: D 1557 Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort.

- C. ICBN — International Code of Botanical Nomenclature.

- D. ICNCP — International Code of Nomenclature of Cultivated Plants.

1.3 DEFINITIONS

- A. Acceptance, Acceptable, or Accepted: Acceptance by the Landscape Architect or Arborist in writing.
- B. Agronomist: Agronomist employed by the Landscape Architect for the Project.
- C. Arborist: Arboricultural consultant employed by Landscape Architect for the Project.
- D. Caliper: Trunk diameter measured at a point 6 inches above natural ground surface for trees up to 4 inches caliper, and measured at a point 12 inches above natural ground surface for trees over 4 inches in caliper.
- E. Excessive Compaction of Soil or Soil Mix: Compaction greater than 75 percent dry density, as determined by ASTM D 1557.
- F. Extra Trees or Overstock Trees: Extra furnished trees to be used as replacement trees.
- G. Injury: Any bruising, scarring, tearing, or breaking of roots, branches or trunk.
- H. IPM — Integrated Pest Management: An approach to pest control that utilizes regular monitoring to determine if and when treatments are needed and employs physical, mechanical, cultural, biological and educational tactics to keep pest numbers low enough to prevent intolerable damage or annoyance. Least-toxic chemical controls are used as a last resort.
- I. Landscape Architect: Landscape architect employed by Architect to prepare Landscape Construction Documents for Project.
- J. Pest: insects, mice and other animals, unwanted plants (weeds), fungi, or microorganisms like bacteria and viruses.
- K. Pesticide: A pesticide is any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any pest. Though often misunderstood to refer only to insecticides, the term pesticide also applies to herbicides, fungicides, and various other substances used to control pests. Under United States law, a pesticide is also any substance or mixture of substances intended for use as a plant regulator, defoliant, or desiccant.
- L. Plant Height: Measurement of main body height, not measurement to top branch.
- M. Plant Spread: Measurement of main body diameter, not measurement from branch tip to tip.
- N. Replacement Tree: Tree used as a replacement for dead tree or tree not in a vigorous, thriving condition, as determined by the Arborist.
- O. Significant Pest: A pest that seriously threatens or has the potential to seriously threaten the plant health and appearance of the tree, as determined by the Arborist.
- P. Swamp White Oak: *Quercus bicolor* tree.

- Q. Sweetgum: Liquidambar styraciflua tree.
- R. Tree Planting Zones: Zones of trees indicated on the Tree Planting Zone Plan.
- S. Undue Stress: Stressed condition of tree's health caused by the Contractor's failure to meet Requirements of this Section.
- T. Zone 1 Trees: Sweetgums and Swamp White Oaks within the Plaza area, as indicated on the Tree Planting Zone Plan.
- U. Zone 2 Trees: Swamp White Oaks within the West Street Sidewalk area, as indicated on the Tree Planting Zone Plan.
- V. Zone 3 Trees: Swamp White Oaks within the Liberty, Fulton, and Greenwich Sidewalk areas, as indicated on the Tree Planting Zone Plan.
- W. Zone 4 Trees: Swamp White Oaks at northeast corner area, as indicated on the Tree Planting Zone Plan.

1.4 ACTION SUBMITTALS

- A. General Requirements: Refer to Section 01330.
- B. Product Data:
 - 1. Soil Amendments.
 - 2. Pesticides.
 - 3. Anti-desiccant.

1.5 INFORMATIONAL SUBMITTALS

- A. General Requirements: Refer to Section 01330.
- B. Product Purchase and Delivery Documentation: Within 5 working days of each application of soil amendment and pesticide, submit purchase orders, invoices, and receipts showing supplier name and address, person who sold product, date of purchase, specific product purchased, quantity purchased, and delivery date.
- C. Maintenance Log:
 - 1. Maintain a daily record of work performed until Owner acceptance of maintenance.
 - 2. Include precipitation records from on-site rain gauge; time and duration of each water application; chemical and fertilizer applications; irrigation problems; drainage problems; soil temperatures; visual observations of plants, tests performed; and moisture sensor readings.
 - 3. Make log available for review at any time by the Owner, the Arborist, and the Landscape Architect.
 - 4. At end of maintenance period, submit to the Owner a complete and chronologically organized maintenance log as a digital file, saved in Microsoft Office® format, and one printed copy.
- D. Documentation of Accepted Conditions: Within 7 working days after the Owner's acceptance of maintenance, submit color photographs and a written report documenting the Owner's accepted conditions of the plant material.

- E. Certificates: Certificate indicating chemical applicator is currently certified by the State of New York for commercial application, name of applicator, and State of New York license number.
- F. Stressed Plant Condition Inspection Reports: Plant inspection report documenting damage and signs of stress, pests, and disease, submitted via e-mail to the Owner, the Landscape Architect, and the Arborist within 48 hours of observation.
- G. Test Reports: Soil test reports for soil samples taken from tree root zone areas.

1.6 QUALITY ASSURANCE

- A. Maintenance Personnel Qualifications:
 - 1. Demonstrated experience in plant health care management including experience and training in integrated pest management, water management, pest control, soil management, tree fertilization, and tree pruning.
 - 2. Thoroughly familiar and trained in the work to be accomplished and perform the task in a competent efficient manner.
- B. Pesticide Applicator Qualifications: Pesticide treatments shall be performed by an acceptable, qualified, and experienced plant health care technician that is currently certified in New York State to be a commercial pesticide applicator.
- C. Regulatory Requirements:
 - 1. Meet requirements of applicable laws, codes, OSHA regulations, and other regulations required by authorities having jurisdiction over Work.
 - 2. Provide for inspections and permits required by Federal, State, or local authorities in furnishing, transporting, and installing of chemicals.
 - 3. Submit a record of pesticides used to the County agricultural commissioner's office and other agencies as required by law.

1.7 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Plant Material: Meet requirements of Section 02931.

1.8 SITE CONDITIONS

- A. Environmental Requirements: Do not apply materials to tree foliage during windy conditions, when ambient air temperatures are above 80 degrees Fahrenheit or below 45 degrees Fahrenheit, or when precipitation is expected within 12 hours.

1.9 SEQUENCING AND SCHEDULING

- A. Work Schedule:
 - 1. Perform maintenance during normal working hours.
 - 2. Be present at the project site at least once a week and as often as necessary to perform specified maintenance.
- B. Pesticide Applications:
 - 1. Notify the Owner's Representative and Arborist at least 48 hours in advance of required Pesticide applications.
 - 2. Obtain the Owner Representative's and Arborist's approval of application schedule.

PART 2 — PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS AND SUPPLIERS

- A. Anti-desiccant: Miller Chemical & Fertilizer Corporation, Hanover, PA, (717) 632-8921, www.millerchemical.com; or accepted substitute.
- B. Soil Amendments:
 - 1. Plant Health Care Inc., Pittsburgh, PA, (800) 421-9051, www.planthealthcare.com; or accepted substitute.
 - 2. Mycorrhizae Applications, Inc., Grants Pass, OR; (514) 476-3985; www.mycorrhizae.com; or accepted substitute.
 - 3. Bio-Plex, Manheim, PA, (800) 441-3573, www.bio-plex.com; or accepted substitute.
 - 4. Nutri-Sul 90, Elemental Sulfur 90%: The Doggett Corporation, Lebanon, NJ; (908) 236-6335, www.doggettcorp.com; or accepted substitute.
 - 5. Pulverized Limestone: LimeCrest Corp., Sparta, NJ; (973) 383-2000; or accepted substitute.
- C. Pesticides:
 - 1. Insecticide for Control of Borers (Merit 75 WSP): Bayer CropScience Research, Triangle Park, NC; (800) 842-8020, www.bayercropscienceus.com; or accepted substitute.
 - 2. Insecticide (Astro) for Control of Leaf Chewing Caterpillars And Aphids: FMC Corp, Philadelphia, PA; (215) 299-6000, www.fmc.com; or accepted substitute.
 - 3. Insecticide (Horticultural Oil) for Control of Scale Insects: Lesco, Inc., Cleveland, OH; (216) 706-9250, www.lesco.com; or accepted substitute.
 - 4. Miticide (Avid) For Control of Spider Mites: Syngenta Professional Products, Greensboro, NC; (866) 796-4368, www.syngentaprofessionalproducts.com; or accepted substitute.
 - 5. Fungicide (Banner Maxx) for Treatment of Anthracnose: Ciba-Geigy Corp., Greensboro, NC.; or accepted substitute.
 - 6. Spreader Sticker (Nu-Film) Spray Adjuvant: Miller Chemical and Fertilizer Corp., Hanover, PA; (717) 632-8921, www.millerchemical.com; or accepted substitute.
 - 7. Herbicide for Weed Control (RoundUp): Monsanto Co., St. Louis, MO; (314) 694-1000, www.monsanto.com; or accepted substitute.
- D. Moisture Sensors and Related Material and Equipment: As specified in Section 02931.

2.2 MATERIALS

- A. Replacement Plant Material:
 - 1. Match existing genus, species, cultivar, size, and quality.
 - 2. Meet requirements of Section 02931.
- B. Potential Soil Amendments to be Required by Fertilization Program Determined by the Arborist and Agronomist:
 - 1. Doggett Injecto Feed 32-7-7; or accepted substitute.
 - 2. Doggett Injecto Feed 12-24-24; or accepted substitute.
 - 3. AgriPlex Micro-Mix micronutrient supplement; or accepted substitute.
 - 4. PHC BioPak Plus 3-0-20 micronutrient biofertilizer; or accepted substitute.
 - 5. Soluble Mycorrhizal Drench; or accepted substitute.
 - 6. Bio-Plex Technical Concentrate and Plant Enhancer biostimulant; or accepted substitute.

7. Doggett Nutri-Sul 90 Elemental Sulfur 90%; or accepted substitute.
 8. Pulverized limestone, dolomitic or non-dolomitic; or accepted substitute.
 9. Other fertilizers and soil amendments that may be required, subject to the acceptance of the Arborist.
- C. Potential Pesticides to be Required as Determined by Ongoing IPM Monitoring:
1. Insecticide for Control of Flat-Headed Borers: Merit 75 WSP (Imidacioprid); or accepted substitute.
 2. Insecticide for Control of Leaf Feeding Caterpillars and Aphids: Astro (Permethrin); or accepted substitute.
 3. Insecticide for Control of Scale Insects: Horticultural Oil, (Superior horticultural oil); or accepted substitute.
 4. Miticide for Control of Spider Mites: Avid 0.15 EC, (Abamectin); or accepted substitute.
 5. Fungicide Treatments for Control of Oak Anthracnose: Banner Maxx, (Propiconazole); or accepted substitute.
 6. Herbicide for Control of Invasive Weeds: Round-Up (Glyphosate); or accepted substitute.
 7. "Spreader-Sticker" Spray Adjuvant to be Mixed with Certain Pesticides: Nu-Film; or accepted substitute.
 8. Other pesticides that may be required, subject acceptance of the Arborist.
- D. Root Ball Anchor Materials for Replacement Trees: Same as original installation.
- E. Wood Chip Mulch: Same material as accepted and installed under Section 02931.
- F. Anti-desiccant: Vapor Gard; or accepted substitute.

PART 3 — EXECUTION

3.1 PREPARATION

- A. Protection of Existing Conditions:
1. Use every possible precaution to prevent damage to existing conditions to remain such as structures, utilities, plant materials and walks on or adjacent to the site of the Work.
 2. Use every possible precaution to prevent excessive compaction of planting area soil and soil mixes within or adjacent to the areas of Work.
 3. Provide barricades, fences or other barriers to protect existing conditions from damage during maintenance operations.
 4. Do not store materials or equipment, permit burning, or operate or park equipment under the branches of existing plants.
 5. Submit written notification of damaged plants and structures to the Owner's Representative immediately.

3.2 GENERAL MAINTENANCE REQUIREMENTS

- A. Maintenance Period:
1. Continuously maintain trees in each tree planting zone from time of plant installation, during progress of Work, and for a minimum period of 2 calendar years from date of acceptance of tree installation Work, until the Owner accepts maintenance responsibility for the trees in the respective tree planting zone.

2. Continuously maintain irrigation system for trees in each planting zone during progress of Work, and for a minimum period of 2 calendar years from date of acceptance of tree installation Work, until the Owner accepts maintenance responsibility for the trees in the respective planting zone.
- B. Integrated Pest Management: Employ principles of integrated pest management for each aspect of maintenance.
- C. Maintenance Objectives: Perform Work with the objectives of: maintaining plants in a healthy, vigorous condition; maximizing speed of post-planting recovery and growth; maximizing height growth; maximizing bottom of canopy height; improving branching structure and appearance; and improving uniformity in height, spread, and canopy bottom height.

3.3 SCHEDULE AND SEQUENCE OF MAINTENANCE WORK

- A. First Spring:
 1. Apply soil amendments in accordance with the soil amendment program determined by the Arborist and Agronomist.
 2. Monitor soil moisture and adjust irrigation frequency and application times accordingly, and apply supplemental irrigation as required to provide optimum moisture to root balls.
 3. Provide supplemental irrigation to groundcovers via hand-watering, when necessary, to avoid excessive irrigation of the trees.
 4. Perform plant health care monitoring inspections as frequently as needs dictate, but no less than once per month, and complete pest and disease control, cultural, and other treatments necessary to ensure that the trees and other plants are healthy and maintained in accordance with the maintenance objectives.
 5. Maintain continuous control over weeds in all non-paved areas.
- B. First Summer:
 1. Continually monitor soil moisture and immediately adjust irrigation frequency or application rate accordingly, or immediately apply supplemental irrigation, if deemed necessary.
 2. Provide supplemental irrigation to groundcovers via hand-watering, when necessary, to avoid excessive irrigation of the trees.
 3. Perform plant health care monitoring inspections as frequently as needs dictate, but no less than once per month, and complete pest and disease control, cultural, and other treatments necessary to ensure that the trees and other plants are healthy and maintained in accordance with the maintenance objectives.
 4. Maintain continuous control over weeds in all non-paved areas.
 5. Apply anti-desiccant to the foliage of trees in accordance with the label rate for "summer transplants" if required by the Arborist.
- C. First Fall and Winter:
 1. Collect representative soil samples prior to the application of fertilizers and other soil amendments, have the samples tested, and submit soil test report.
 2. Apply soil amendments in early October in accordance with the soil amendment program determined by the Arborist and Agronomist.
 3. Continually monitor soil moisture and immediately adjust irrigation frequency or application rate accordingly, or immediately apply supplemental irrigation, if deemed necessary.
 4. Perform plant health care monitoring inspections as frequently as needs dictate, but no less than once per month, and complete pest and disease control, cultural,

- and other treatments necessary to ensure that the trees and other plants are healthy and maintained in accordance with the maintenance objectives.
5. Maintain continuous control over weeds in all non-paved areas.
 6. Apply anti-desiccant to the stems, branches and twigs of all trees if required by the Arborist.
- D. Second Spring:
1. Remove any remaining burlap, twine, trunk wrap, or other materials that may remain on the trees.
 2. Apply soil amendments in March in accordance with the soil amendment program determined by the Arborist and Agronomist.
 3. Replenish wood chip mulch as necessary to maintain a 3-inch deep continuous layer over all exposed soil surfaces.
 4. Continually monitor soil moisture and immediately adjust irrigation frequency or application rate accordingly, or immediately apply supplemental irrigation, if deemed necessary.
 5. Provide supplemental irrigation to groundcovers via hand-watering, when necessary, to avoid excessive irrigation of the trees.
 6. Perform plant health care monitoring inspections as frequently as needs dictate, but no less than once per month, and complete pest and disease control, cultural, and other treatments necessary to ensure that the trees and other plants are healthy and maintained in accordance with the maintenance objectives.
 7. Maintain continuous control over weeds in all non-paved areas.
- E. Second Summer:
1. Continually monitor soil moisture and immediately adjust irrigation frequency or application rate accordingly, or immediately apply supplemental irrigation, if deemed necessary.
 2. Provide supplemental irrigation to groundcovers via hand-watering, when necessary, to avoid excessive irrigation of the trees.
 3. Perform plant health care monitoring inspections as frequently as needs dictate, but no less than once per month, and complete pest and disease control, cultural, and other treatments necessary to ensure that the trees and other plants are healthy and maintained in accordance with the maintenance objectives.
 4. Maintain continuous control over weeds in all non-paved areas.
 5. Apply anti-desiccant to the foliage of all trees in accordance with the label rate for "summer transplants" if required by the Arborist.
- F. Second Fall and Winter:
1. Collect representative soil samples prior to the application of fertilizers and other soil amendments, have the samples tested, and submit soil test report.
 2. Apply soil amendments in early October in accordance with the soil amendment program determined by the Arborist and Agronomist.
 3. Continually monitor soil moisture and immediately adjust irrigation frequency or application rate accordingly, or immediately apply supplemental irrigation, if deemed necessary.
 4. Perform plant health care monitoring inspections as frequently as needs dictate, but no less than once per month, and complete pest and disease control, cultural, and other treatments necessary to ensure that the trees and other plants are healthy and maintained in accordance with the maintenance objectives.
 5. Maintain continuous control over weeds in all non-paved areas.

6. Prune each tree when dormant under the direction of the Arborist with the objectives of:
 - a. Raising crowns of Base Bid trees to 13 to 15 feet clear at the trunk, or raising crowns of Alternate No. 1 trees to 10 to 12 feet clear at the trunk, unless directed otherwise by the Arborist.
 - b. Removing dead, damaged, diseased, crossing and conflicting, poorly spaced, or otherwise objectionable branches, as directed by the Arborist.
 - c. Removing or continuing to subordinate codominant or otherwise undesirable branches, as directed by the Arborist.

- G. Third Spring:
 1. Apply soil amendments in March in accordance with the soil amendment program determined by the Arborist and Agronomist.
 2. Replenish wood chip mulch as necessary to maintain a 3-inch deep continuous layer over all exposed soil surfaces.
 3. Continually monitor soil moisture and immediately adjust irrigation frequency or application rate accordingly, or immediately apply supplemental irrigation, if deemed necessary.
 4. Provide supplemental irrigation to groundcovers via hand-watering, when necessary, to avoid excessive irrigation of the trees.
 5. Perform plant health care monitoring inspections as frequently as needs dictate, but no less than once per month, and complete pest and disease control, cultural, and other treatments necessary to ensure that the trees and other plants are healthy and maintained in accordance with the maintenance objectives.
 6. Maintain continuous control over weeds in all non-paved areas.

3.4 REQUIREMENTS FOR SPECIFIC MAINTENANCE WORK

- A. General Watering:
 1. Use a soil sample tube and moisture sensors to check rootball moisture and surrounding soil moisture at representative plants at least twice a week.
 2. Maintain watering basins around trees and shrubs so that enough water can be applied to establish moisture through root zones.
 3. Open basins to allow surface drainage away from the root crown when excess water accumulates. Restore watering basins when needed to adequately water root balls.
 4. Remove watering basin berms at the end of the maintenance period and form mulch area around trees as indicated on the Drawings.
 5. Adjust frequency and length of time for watering cycles according to changing soil and weather conditions.
 6. When some plants but not every plant within a valve zone require supplemental water due to varying soil or microclimate conditions, apply supplemental water to watering basins by hand using a hose and water wand to break the water force.
 7. Do not permit crown roots to become exposed to air through dislodging of soil and mulch.
 8. Maintain depth of mulch to reduce evaporation and frequency of watering.

- B. Settled or Leaning Plants: Reset plants to proper grades or upright position when weather and soil conditions permit.

- C. Weed Control:
 1. Keep mulched areas between plants and watering basins weed free.
 2. As a last resort use least toxic herbicides.
 3. Avoid frequent soil cultivation that injures shallow roots.

- D. Preliminary Soil Amendment Program to Establish Bid Price:
1. Apply amendments to trees semi-annually in spring before March 30, and in fall after October 21, or when directed by the Arborist.
 2. Mix 20 pounds of Injecto-Feed 32-7-7, 1 gallon of Agri-Plex 0-4-4, and Mycor Tree Saver OR PHC BioPak Plus at "stress recovery" rates, as directed by the Arborist, in 100 gallons of water, and apply in accordance with label instructions to the top and sides of each root ball and the surrounding soil by soil injection method.
 3. Irrigate trees on same day of fertilizer application by operating spray heads for 20–30 minutes and 45–60 minutes for rotary heads, unless directed otherwise by the Arborist.
 4. Water in short cycles so that run-off does not occur.
- E. Final Soil Amendment Program:
1. The Arborist and Agronomist will develop a custom soil amendment program based on soil test results with the primary objectives of promoting post-planting recovery and the resumption of normal growth.
 2. Apply amendments as directed in writing by the Arborist after the Arborist and Agronomist determine the amendment requirements.
- F. General Tree Pruning:
1. Meet requirements of ANSI A300 for Definitions, Pruning Tools and Equipment, Pruning Cuts, and Wound Treatment.
 2. Perform crown cleaning to eliminate weak branches, water sprouts, dead growth, dying growth, diseased growth, and damaged growth.
 3. Perform crown thinning, crown reduction, crown raising, and other pruning, as directed by the Arborist.
 4. Do not cut back to fewer than six buds or leaves on branches.
 5. Prune damaged trees or those that constitute health or safety hazards at any time of year.
 6. Two to three years after installation, prune each tree to raise bottom of canopy to 13 to 15 feet above paving for Base Bid trees, or to 10 to 12 feet above the paving for Alternate No. 1 trees, as directed by the Arborist.
- G. Root Ball Anchor Systems: Immediately prior to the installation of the paver support plate over each root ball, check and adjust cable tension as required, to keep root balls from moving during winds..
- H. Replacement of Trees: Replace, at no additional cost to the Owner, and as soon as weather conditions permit, trees not in a vigorous, thriving condition, during and at the end of the maintenance period.

3.5 PEST AND DISEASE CONTROL

- A. General:
1. Employ principles of IPM in the selection of preventative and control measures for plant pests and diseases.
 2. Insignificant pests will be tolerated providing they do not seriously threaten planting health and appearance unless directed otherwise by the Arborist.
 3. Monitor the site closely and take timely action to address problems identified.
 4. When necessary apply the least toxic pesticide required for the existing problem, unless directed otherwise by the Arborist.
 5. Apply sprays only if a pest or disease is a serious threat and cease application after problem is under control, unless directed otherwise by the Arborist.

6. Spray with extreme care to avoid hazards to any person, animal, automobile, or sensitive environment in the area or adjacent areas.
 7. Meet requirements of pesticide manufacturer's current printed label and application instructions.
 8. The Contractor shall be held liable for plant damage due to the use of pesticides.
- B. Plant Condition Inspection:
1. Inspect trees weekly for damage and signs of stress, pests, and disease.
 2. Submit a written and photographic inspection report of observed damage, and signs of stress and pests via e-mail to the Owner, the Landscape Architect, and Arborist within 48 hours of observations.
 3. Use a digital camera with at least 5.0 megapixels of resolution to document observations.
- C. Spraying:
1. When necessary apply the least toxic chemical required for the existing problem.
 2. Meet requirements of manufacturer's current printed instructions.
 3. Apply sprays only if pest is a serious threat and cease application after problem is under control.
 4. Make spray applications in early morning hours, prior to 7:00 a.m., unless approved otherwise by Owner and Arborist.
- D. Preliminary Pesticide Application Schedule to Establish Bid Price: See Preliminary Pesticide Application Schedule under Part 3 of this Section.
- E. Final Pesticide Application Schedule: As directed by the Arborist in writing.

3.6 IRRIGATION SYSTEM

- A. Damages:
1. Repair at no additional cost to the Owner damages to system caused by Contractor's operations.
 2. Perform repairs before next irrigation cycle commences.
- B. Cleaning and Monitoring the System:
1. Continually monitor the irrigation systems to verify that they are functioning properly as designed.
 2. Clean filters and strainers at least once a month and as often as necessary to keep the irrigation systems free of sand and other debris.
 3. Set and continuously adjust and program automatic controller for changing water requirements.
 4. Make program adjustments as required by changing field conditions.
 5. At least once a week, daily when required, use a soil sampling tube and tensiometers to check the rootball moisture of representative plants as well as the surrounding soil.
 6. Prevent or minimize spraying on paving, windows, building walls, and other structures, by balancing the throttle control on the remote control valves and the adjustment screws on the sprinkler heads.
 7. Do not allow water to atomize and drift.
 8. Prevent or minimize spraying directly onto tree trunks to prevent injury or discoloration of bark.
 9. Record in writing the daily watering times set for each remote control valve and submit log of times to Owner's Designated Representative, Landscape Architect, and Arborist bi-monthly for record purposes.

- C. Winterization: Prior to first freeze, drain irrigation system in the fall of the first year after installation and restart system in the following spring.

3.7 WOOD CHIP MULCH AREAS

- A. Surface Smoothness: Check surface of mulch twice annually for disturbance and smooth out areas with a rough surface.
- B. Weed Control:
 - 1. Maintain areas weed-free.
 - 2. As a last resort, control weeds with least toxic chemicals.
- C. Replenishment: Add wood chip mulch at the end of each year of maintenance to bring mulch back to 3-inch loose depth.

3.8 FIELD QUALITY CONTROL

- A. Soil Testing to Determine Soil Amendment Program:
 - 1. Collect soil with clean, stainless steel implements and place it in clean plastic bags or soil sampling bags to prevent contamination.
 - 2. Collect soil samples from the site in a manner and in whatever quantity necessary to ensure that the samples are representative of "average" growing conditions at each location.
 - 3. Within each location, identify different areas based on site conditions, such as visible differences in tree growth rates, differences in groundcover vegetation, and prepare a separate composite sample for each area.
 - 4. Collect soil at a depth of 6 to 12 inches from various points between the trunk and two-feet beyond the drip line from several trees within the area.
 - 5. Blend the soil to create a composite sample that represents average conditions within the area.
 - 6. Send soil samples to A&L Eastern Agricultural Laboratories in Richmond, VA and employ laboratory to perform the: 1) A&L Standard Test 1A for organic matter, estimated nitrogen release, phosphorous P1 and P2, potassium, magnesium, calcium, pH, buffer pH, hydrogen, exchange capacity, and percent base saturation; 2) A&L Test 2 for soluble salts, excess lime and sodium; and 3) the A&L Test 3 for sulfur, boron, zinc, manganese, iron, and copper.
 - 7. At least 21 days prior to each scheduled amendment application, submit to the Landscape Architect, Agronomist, and Arborist the laboratory's written soil test report, including the laboratory's soil test data; the laboratory's interpretation of nutritional deficiencies, excesses, and potential toxicities; the laboratory's amendment recommendations; and the laboratory's maintenance recommendations.
 - 8. The Landscape Architect, the Agronomist, and the Arborist will determine the soil amendment programs based on the soil test report which may differ from the soil test report recommendations.
- B. Maintenance Review:
 - 1. At the end of the two-year maintenance period for each tree planting zone, request the Landscape Architect and Arborist to review Work.
 - 2. Submit a written request at least 10 working days prior to the anticipated date of review.
 - 3. If the Landscape Architect and Arborist observe Work that fails to meet the Contract Document requirements the Contractor will receive written notification

from the Owner's Representative of corrective Work preventing Owner acceptance of the maintenance Work.

4. Perform corrective Work within 10 calendar days after the review.
5. Upon completion of the corrective Work, request the Landscape Architect and Arborist to review the Work.
6. Corrective Work followed by Landscape Architect and Arborist's review will be required until the Landscape Architect and Arborist no longer observe Work not meeting the Contract Document requirements.

C. Owner's Acceptance of Maintenance Responsibility:

1. When it appears to the Landscape Architect and Arborist that the maintenance Work conforms to the requirements of the Contract Documents the Contractor will receive written notification designating the day which the Owner will accept maintenance responsibility.
2. Continue maintenance of landscape Work until the date that the Owner accepts maintenance responsibility.

3.9 SCHEDULES

A. Preliminary Pesticide Application Schedule to Establish a Bid Price:

<i>Pesticide Type:</i>	<i>Tree Type:</i>	<i>Total Applications Per Tree:</i>
Imidacloprid Soil Drench:	Swamp White Oak	1
Anti-desiccant:	Swamp White Oak	3
	Sweetgum	3
Horticultural Oil:	Swamp White Oak	1
	Sweetgum	1
Fungicide:	Swamp White Oak	6
Miticide:	Swamp White Oak	2
Insecticide (general foliar spray):	Swamp White Oak	2
	Sweetgum	1

B. Preliminary Soil Amendment Application Schedule to Establish Bid Price:

<i>Fertilizer:</i>	<i>Total Applications Per Tree:</i>
N-P-K Plus Micronutrients:	5
Mycorrhizae Drench:	2
Biostimulant:	2

C. Preliminary Schedule of Other Treatments to Establish Bid Price:

<i>Treatment:</i>	<i>Total Treatments Per Tree:</i>
Mulch Replenishment:	2
Scheduled Pruning:	1

END OF SECTION

SECTION 02810

IRRIGATION

PART 1 — GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Landscape Irrigation System.
 - 2. Fertigation System.

- B. Related Sections:
 - 1. Section 02312, Planting Area Finish Grading.
 - 2. Section 02910, Planting Soil Preparation.
 - 3. Section 02912, Structural Planting Soil Mix.
 - 4. Section 02921, Lawn Sodding.
 - 5. Section 02930, Planting Materials.
 - 6. Section 02931, Trees.
 - 7. Section 02935, Landscape Maintenance Period.
 - 8. Section 02936, Landscape Maintenance Period for Trees.

1.2 REFERENCES

- A. NEC — National Electric Code, current edition.

- B. UPC — Uniform Plumbing Code, current edition.

- C. ASTM — ASTM International:
 - 1. B 3 — Specification for Soft or Annealed Copper Wire.
 - 2. D 698 — Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort.
 - 3. D 1557 — Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort.
 - 4. D 1784 — Specification for Rigid PVC Compounds and CPVC Compounds.
 - 5. D 1785 — Specification for PVC Plastic Pipe, Schedules 40, 80, and 120.
 - 6. D 2287 — Specification for Nonrigid Vinyl Chloride Polymer and Copolymer Molding and Extrusion Compounds.
 - 7. D 2241 — Specification for PVC Pressure-Rated Pipe (SDR Series).
 - 8. D 2464 — Specification for Threaded PVC Plastic Pipe Fittings, Schedule 80.
 - 9. D 2466 — Specification for PVC Plastic Pipe Fittings, Schedule 40.
 - 10. D 2467 — Specification for PVC Plastic Pipe Fittings, Schedule 80.
 - 11. D 2564 — Specification for Solvent Cements for PVC Plastic Piping Systems.
 - 12. D 2672 — Specification for Joints for IPS Pipe Using Solvent Cement.
 - 13. D 2855 — Practice for Making Solvent-Cemented Joints with PVC Pipe and Fittings.
 - 14. F 402 — Practice for Safe Handling of Solvent Cements and Primers Used for Joining Thermoplastic Pipe and Fittings.
 - 15. F 656 — Specification for Primers for Use in Solvent Cement Joints of PVC Plastic Pipe and Fittings.
 - 16. F 690 — Practice for Underground Installation of Thermoplastic Pressure Piping Irrigation Systems.

- D. ANSI — American National Standards Institute: NSF 14— Plastics Piping Components and Related Materials.

1.3 DEFINITIONS

- A. Acceptance, Acceptable, or Accepted: Acceptance by the Landscape Architect in writing.
- B. Excessive Compaction: Planting area soil or soil mix compaction greater than 75 percent of maximum dry density as determined by ASTM D 1557.
- C. PVC: Polyvinyl Chloride.
- D. SDR: Standard Dimensional Ratio.
- E. AWG: American Wire Gauge.

1.4 SUBMITTALS

- A. General Requirements: Refer to Sections 01300, 01700, and 01730.
- B. Product Data: For complete list of products, materials, equipment, and assemblies to be installed.
- C. Record Documents: Refer to Section 01700.
- D. Record of Irrigation Watering Times: Refer to Section 02935.
- E. Operating and Maintenance Manuals:
 - 1. Include the following information:
 - a. Complete drawings, diagrams and spare parts lists of equipment installed showing components and catalog numbers together with the manufacturer's name and address.
 - b. Title sheet indicating the Contractor's name, address and telephone number.
 - c. Table of Contents.
 - d. Copies of equipment warranties and certificates.
 - e. Complete operating and maintenance instructions in sufficient detail to permit operating personnel to understand, operate, and maintain equipment.
 - 2. Bind manuals with heavy-duty, 3-ring, vinyl or metal-clad, metal-hinged binders with heavy-duty index tabs.
 - 3. Contractor shall be responsible for accuracy of information and errors or omissions.
 - 4. Submit 3 bound copies to the Owner's Representative upon Final Completion.
- F. QUALITY ASSURANCE
- G. Contractor Qualifications: Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the Work of this Section.

- H. Regulatory Requirements: Meet requirements of applicable laws, codes, and regulations required by authorities having jurisdiction over Work, including the UPC and NEC.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Storage:
 - 1. Meet requirements of material and product manufacturer's current printed instructions.
 - 2. Store products with protection from weather or other conditions which would damage or impair the effectiveness of the product.
 - 3. Protect PVC pipes and fittings from direct sunlight.
 - 4. Store pipe on level beds equal to or greater than length of pipe.

1.6 SEQUENCING AND SCHEDULING

- A. Sleeves and Conduit at Utility Corridors and Under Paving: Coordinate and schedule with utility installers the appropriate time to install sleeves and conduit.

1.7 SITE CONDITIONS

- A. Environmental Requirements:
 - 1. Do not lay PVC pipe when there is water in trench.
 - 2. Backfill trenches when PVC pipe is not in an expanded condition due to heat or pressure.
 - 3. Cool pipe by operating the system a short time before backfill, or backfill in early morning.
 - 4. Avoid installation and trench backfill during heat of the day on straight runs of more than 500 feet.
- B. Existing Conditions:
 - 1. Prior to Work commencement review locations of existing public underground utilities and structures with utility companies and clearly mark locations in field.
 - 2. Prior to Work commencement review location of existing private underground utilities and structures with the Owner's Representative and clearly mark locations in field.

1.8 WARRANTY

- A. General: In addition to manufacturer's guarantees or warranties, warrant Work for one year from the date of Final Completion against defects in material, equipment and workmanship.
- B. Additional Items Covered: Warranty shall also cover settlement of trench backfill and repair of damage to other materials and workmanship resulting from defects in materials, workmanship and settlement.

1.9 MAINTENANCE

- A. Extra Materials:
 - 1. Three of any special tool required for the maintenance of each type of component used in the system.
 - 2. Two quick-coupling valve keys and two hose swivels.
 - 3. Two keys to each controller box.

4. Two of any special tool required for the maintenance of each type of component of the irrigation system.
 5. Other items indicated on the Drawings.
- B. Maintenance Service: Refer to Section 02935.

PART 2 — PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS AND SUPPLIERS

- A. Control System: Tucor Inc., Wexford, Pa.; (724) 935-6850; www.tucor.com.
- B. Valve Boxes:
1. Carson-Brooks Plastics, Inc., Glendora, CA.
 2. Applied Engineering Products, Chino, CA.
 3. Or equal.
- C. Pure Black Castings Liquid Extractor: Vermi Technology, Orange Lake, Fla.; (352) 591-1111; www.vermitechnology.com.

2.2 MATERIALS

- A. General Requirements for Pressure PVC Pipe: NSF approved Type 1, Grade I, ASTM D 1784 PVC, meeting requirements of ANSI NSF 14, marked with manufacturer's name, nominal pipe size, schedule or class, PSI pressure rating, NSF seal of approval, and extrusion date.
- B. Pressure Supply Line Piping 2-Inch and Larger: ASTM D 2241 PVC, Class 315.
- C. Pressure Supply Line Piping 1-1/2-Inch and Smaller: ASTM D 1785 PVC, Schedule 40.
- D. Non-Pressure PVC Pipe: NSF approved Type 1, Grade II, ASTM D 2241, Class 200 ASTM D 1784 PVC pipe with solvent weld joints, meeting requirements of ANSI NSF 14.
- E. General Requirements for Pressure and Non-Pressure PVC Fittings: Marked with manufacturer's name or trademark, material designation, size, applicable IPS schedule and NSF seal of approval.
- F. Fittings for Pressure Supply Pipe: ASTM D 2467, schedule 80.
- G. Fittings for Non-Pressure Supply Pipe: ASTM D 2466, schedule 40.
- H. Plastic Nipples: ASTM D 2464, schedule 80, Type I, Grade 1, PVC, threaded both ends, uniformly grey in color.
- I. Primer for Solvent Cement Joints: ASTM F 656.
- J. Solvent Cement for Joints: ASTM D 2564.
- K. Sleeves for Control Wire and Water Lines: PVC Schedule 40 pipe.
- L. Controllers:

1. Two-wire decoder system with the technology to allow Owner to expand or modify the irrigation system after initial installation.
 2. Wire runs with ability to operate at a distance of over three miles while operating at least five valves simultaneously.
 3. Controller shall have a built in modem.
 4. Controller shall have ability to be monitored and managed remotely from the Owner's maintenance PC (minimum requirements Windows 2000).
 5. Controller shall have ET based scheduling via connection to weather station.
 6. Controller shall have a flow management program.
 7. Controller shall have capability to determine when and where there is a water line break or leak.
 8. Controller shall have capability to utilize at least 9 moisture sensors per point of connection.
 9. Controller shall have capability to have up to 10 points of connection with flow sensors and master valves without additional equipment.
 10. Controller shall have capacity of 200 stations.
- M. Master Control Valves: Normally open, diaphragm made of chloramine-resistant material, cast iron body with epoxy-fused coating and removable seat, self-cleaning, self-purging, slow closing speed, with a watertight epoxy molded solenoid coil.
- N. Flow Sensor: Non-magnetic with pulse output.
- O. Remote Control Valves: Lightning protected with a very low power solenoid, diaphragm made of chloramine-resistant material, cast iron valve body with epoxy-fused coating and removable seat, self-cleaning, self-purging, slow closing speed, with a watertight epoxy molded solenoid coil.
- P. Control Wires: ASTM B 3, solid copper wires, 14 AWG minimum, in a polyethylene jacket, approved and classified for direct burial in ground, color other than white.
- Q. Control Wire Splicing Materials: Aqua Splice Heat Shrink Splice as manufactured by Raychem, DBY as manufactured by 3M, or equal.
- R. Valve Boxes for Remote Control Valves in Planters: Carson-Brooks No. 1419B-12B, with T-top covers, purple color boxes and black color lids; Applied Engineering Products No. 1015, with T-top covers, purple color boxes and black color lids; or equal.
- S. Valve Boxes for Quick Coupling Valves in Planters: Carson-Brooks No. 910-12B, purple color boxes and black color T-top covers; Applied Engineering Products No. 910L, purple color boxes and black color T-top covers; or equal.
- T. Quick-Coupling Valves: Refer to Drawings.
- U. Quick-Coupling Valve Keys: Fitted with 3/4-inch hose ends.
- V. Heads: Refer to Drawings.
- W. Steel Stakes and Pipe Clamps: Refer to Drawings.
- X. Trench Backfill Under On-Grade Paving: Pit run sand or fine aggregate with at least 90 percent passing number 4 sieve and no more than 10 percent passing number 200 sieve.

- Y. Trench Backfill at On-Structure Planters: Soil mix from planters.
- Z. Fertigation System: Stand-alone type with mister-type injector, ability to use either liquid type or water soluble fertilizer with a 600 gallon tank. Type of fertilizer to be used shall be determined by Contractor's fertilizer distributor at time of start-up after review of water and soil test reports.
- AA. Pure Black Castings Liquid Extractor: Vermi Technology VTU-1000.
- BB. Conduit for Control Wire: Schedule 40 PVC.

PART 3 — EXECUTION

3.1 EXAMINATION

- A. Verification of Conditions: Examine site and verify that conditions are suitable to receive Work and that no defects or errors are present which would cause defective installation of products or cause latent defects in workmanship and function.
- B. Notification of Unsuitable conditions: Before proceeding with Work, notify the Owner's Representative in writing of unsuitable conditions.

3.2 PREPARATION

- A. Protection:
 - 1. Use every possible precaution to prevent damage to existing conditions to remain such as structures, utilities, irrigation systems, plant materials and paving on or adjacent to the site of the Work.
 - 2. Provide barricades, fences or other barriers to protect existing conditions to remain from damage during construction.
 - 3. Do not store materials or equipment, permit burning, or operate or park equipment under the drip line of existing plants to remain or over existing irrigation heads to remain.
 - 4. Use every possible precaution to prevent excessive compaction of planting area soil or soil mixes within or adjacent to the areas of Work.
 - 5. Submit written notification of conditions damaged during construction to the Owner's Representative immediately.

3.3 LAYOUT

- A. General:
 - 1. During installation, conform as closely as possible to Drawings.
 - 2. Drawings are diagrammatic to the extent that swing joints, offsets and fittings are not shown, and piping is not shown in exact location.
 - 3. Determine accepted tree locations prior to pipe trenching.
 - 4. Do not install pipe under tree root balls.
- B. Point of Connections: Where connections to existing water supply lines are required, provide up to 100 additional feet of pressurized mainline pipe and related fittings and accessories at no additional cost to the Owner should point of connections have to be located differently from where shown on the Drawings.

- C. Piping:
 - 1. Where piping is shown on Drawings in paved areas but running parallel and adjacent to planted areas, install piping in planted areas, unless specifically noted to be installed in paved areas.
 - 2. Do not install pipe directly over another line in same trench.

3.4 TRENCHING

- A. Excavation: Dig trenches straight to support pipe continuously on bottom of trench.
- B. Trench Depths:
 - 1. In planting areas, excavate trenches to provide 18 inches minimum cover for pipe on pressure side of valves in planting areas.
 - 2. Under paving, excavate trenches to provide 24 inches minimum cover for wiring, pipe on pressure side of valves, and non-pressure pipe.
 - 3. In planting areas, excavate trenches to provide 18 inches minimum cover for wiring.
 - 4. In planting areas, excavate trenches to provide 12 inches minimum cover for non-pressure lines to spray heads and 18 inches minimum cover for non-pressure lines to rotor heads.

3.5 CONDUITS AND SLEEVE INSTALLATION

- A. Conduit:
 - 1. Furnish and install conduit where control wires pass under or through paving, curbs, walls and other structures.
 - 2. Extend conduit 12 inches beyond edges of paving, curbs, walls and other structures.

3.6 PIPE LINE ASSEMBLY

- A. Manufacturer's Requirements: Meet requirements of pipe, pipe fitting and solvent manufacturers' current printed instructions.
- B. Cleaning: Clean pipes and fitting of dirt, scales and moisture before assembly.
- C. Solvent-Cemented Joints for PVC Pipes:
 - 1. Meet requirements of ASTM F 402 and ASTM D 2855, except requirements in conflict with the manufacturer's current printed instructions.
 - 2. Meet requirements of ASTM D 2672 for IPS pipe, except requirements which conflict with the manufacturer's current printed instructions.
 - 3. Use solvents and methods recommended by pipe manufacturer.
 - 4. Let solvents cure a minimum of one hour before applying any external stress on the piping and at least 24 hours before placing the joint under water pressure.
- D. Threaded Joints for Plastic Pipes:
 - 1. Use Teflon tape on threaded PVC fittings.
 - 2. Use strap-type friction wrench only.
 - 3. Do not use metal-jawed wrench.
- E. PVC to Metal Pipe Connections:
 - 1. Make metal connections first.
 - 2. Use joint compound.

3. Do not over-tighten.
4. Where threaded PVC connections are required, use threaded PVC adaptors into which pipe may be welded.

F. Laying of Pipe:

1. Remove from trench rocks or clods 1-inch diameter or larger.
2. Bed pipes in at least 2 inches of soil excavated from trench.
3. Snake pipe from side to side of trench bottom to allow for expansion and contraction, allowing at least one additional 1 foot per 100 feet of pipe.
4. Do not lay PVC pipe when there is water in the trench.
5. Backfill on sides of piping to provide uniform bearing.

G. Parallel Pipe Line Clearance:

1. Install pipe with 4 inches space between lines and minimum 6 inches from lines of other trades.
2. Do not install pipes directly over one another.

3.7 IRRIGATION CONTROL VALVE INSTALLATION

- A. Manufacturer's Requirements: Meet requirements of manufacturer's current printed instructions.
- B. Valve Locations: Install control valves where shown on Drawings and group together as shown on Drawings.
- C. Valve Boxes:
 1. Locate valve boxes over valves and related pipe fittings in a horizontal position which allows easy removal and servicing.
 2. Align valve boxes parallel with adjacent material edges as detailed in the Drawings.
 3. Equally space valve boxes as detailed in the Drawings.

3.8 SPRINKLER HEAD INSTALLATION

- A. Spray Head Installation: Install spray heads on a swing joint assembly as detailed on the Drawings.

3.9 QUICK COUPLING VALVE INSTALLATION

- A. Installation: Install on a swing joint assembly as detailed on the Drawings.

3.10 AUTOMATIC CONTROLLER INSTALLATION

- A. Manufacturer's Requirements: Meet requirements of manufacturer's current printed instructions.
- B. Code Requirements: Meet requirements of the NEC and other applicable codes.
- C. Locations: Install controllers where indicated on the Drawings.
- D. Wire Connections: Connect control wires to controllers in sequential arrangement according to assigned identification number on plans and keep records of the decoder address for each valve.

- E. Grounding: Ground controllers per article 250 of the NEC.
- F. Modem Connection: Connect controller modems to phone line jack installed in controller enclosure.
- G. Irrigation Diagram:
 - 1. Affix a non-fading copy of irrigation diagram to cabinet door below controller name.
 - 2. Seal irrigation diagram between two plastic sheets 0.025-mm minimum thickness.
 - 3. Irrigation diagram shall be a reduced copy of the record document plan, clearly showing valves operated by the controller, station number, valve size, and type of planting irrigated.

3.11 CONTROL WIRING INSTALLATION

- A. Placement:
 - 1. Install control wires in common trenches with sprinkler mains and laterals wherever possible to the bottom side of pipe line.
 - 2. When control wires cannot be installed in common trenches with pipe, install wire in PVC conduit.
 - 3. Provide an expansion coil for at least every 100 feet of wire length.
 - 4. Form expansion coil by wrapping at least 6 turns of wire around a 1-inch diameter pipe and withdrawing the pipe.
 - 5. Snake wires in trench to allow for contraction of wires.
 - 6. Tie wires in bundles at 10-foot intervals.
- B. Separate 2-Conductor Wires: Install separate 2-conductor control wire for each controller.
- C. Wire Size: 14 AWG minimum, meet size requirements of valve manufacturer.
- D. Color Codes: Common wire — white, other wire — non-white color.
- E. Splicing:
 - 1. Crimp control wire splices at remote control valves.
 - 2. Seal splices with specified splicing materials.
 - 3. Install splices in junction boxes.
- F. Settlement: If settlement occurs, fill depressions with soil mix, raise plants and mulch or reseed as required to repair settled planting areas to the original accepted condition.

3.12 CLOSING OF PIPE AND FLUSHING OF LINES

- A. Capping:
 - 1. Cap or plug openings as soon as lines have been installed to prevent entrance of materials that would obstruct the pipe.
 - 2. Leave caps or plugs in place until removal is necessary for completion of installation.
- B. Flushing:

1. Beginning at riser closest to remote control valve and ending at riser furthest from remote control valve thoroughly flush out water lines before installing heads, valves and other hydrants.
 2. In case of damage to pressure main, reflush lines after each repair is made.
- C. Hydrostatic Testing:
1. Test as specified below.
 2. Upon completion of testing, complete assembly and adjust sprinkler heads for proper water distribution.

3.13 BACKFILLING AND COMPACTING

- A. Planting Areas: After system is operating and required tests and reviews have been made, backfill excavations and trenches with soil.
- B. Un-Sleeved Pipe Under Paving: Provide PVC pipe under paving with minimum of 6 inches of sand backfill cover over pipe and 24-inch cover to bottom of paving.
- C. Existing Underground Pipes at Planters: Backfill with soil mix.
- D. Finish Grading: Bring areas disturbed by irrigation Work back to grades encountered when irrigation Work commenced.

3.14 FERTIGATION SYSTEM

- A. Location: Install fertigation system and Pure Black Castings extractor in mechanical room where indicated on the Drawings.
- B. Installation Requirements: Install fertigation system and extractor in accordance with the manufacturer's current printed instructions.

3.15 FIELD QUALITY CONTROL

- A. General Requirements for Hydrostatic Testing of Piping:
 1. The Owner's Representative will witness hydrostatic testing of pipe prior to backfilling of trenches.
 2. Notify the Owner's Representative at least 72 hours prior to the tests.
 3. Using a hydraulic pump, make hydrostatic tests with risers capped after welded PVC joints have cured at least 24 hours.
 4. Do not use compressed air.
 5. Center load piping with backfill to prevent pipe from moving under pressure.
 6. Leave couplings and fittings exposed.
 7. Perform testing prior to installation of remote control valves.
 8. Piping which loses pressure during specified test period shall fail pressure test.
 9. Locate and repair leaks when piping fails pressure test.
 10. Do not backfill trenches until respective piping passes pressure test.
- B. Pressure Test for Solvent Weld Pipe:
 1. Apply tests after welded plastic pipe joints have cured at least 4 hours or more if manufacturer of solvent cement requires.
 2. Test supply lines per ASTM F690 as follows: (1) add water slowly to pipe to avoid water hammer damage, (2) bleed system to insure all air is out of pipes, (3)

- pressurize system to 125 percent of design operating pressure for one hour, (4) visually inspect for leaks while system is holding pressure constant.
3. Test lateral sprinkler lines at line pressure and visually inspect for leaks.
- C. Pressure and Leakage Test for Gasketed Pipe:
1. Conduct tests after 7 days have elapsed since casting of concrete thrust blocks.
 2. Ensure the release of air from the line during filling so that the pipeline is completely filled with water before testing.
 3. Apply pressure by means of a hydraulic pump and measured with a test gauge.
 4. Pressurize pipeline to 150 percent of working pressure at the point of test, but not less than 125 percent of highest elevation.
 5. Maintain the test pressure by additional pumping if necessary for 2 hours and carefully inspect for leakage.
 6. All defective elements shall be replaced and the test repeated until all visible leakage has been stopped and the allowable leakage requirements have been met by not exceeding an amount determined by the following formula:
- $L=(N)(D) (\text{square root of } P)/7400$ where
L=allowable leakage rate in gallons/hour
N=number of joints in test section
D=nominal diameter of pipe in inches
P=average test pressure.
- D. Coverage Test:
1. When the irrigation system is completed, perform a coverage test to determine if the water coverage for planting areas is complete and adequate.
 2. Perform work required to correct any inadequacies of coverage due to deviation from Drawings.
 3. Conduct test before ground cover material is planted.

3.16 ADJUSTING

- A. Coverage:
1. Adjust sprinkler heads for complete coverage with minimum spray on buildings, paving and other structures.
 2. Make other adjustments, such as changes in nozzle sizes and degrees of arc, as directed by the Landscape Architect, at no additional cost to the Owner.
- B. Flow Control:
1. Throttle flow control at valves for optimum operation without misting.
 2. When throttling is not required to control misting or overspray, back off manual flow control 1/2 to 1-1/2 turns from point where closing affects sprinkler coverage.

END OF SECTION

SECTION 02910

PLANTING SOIL PREPARATION

PART 1 — GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Planter Soil Mix.
 - 2. Structural Planting Soil Mix.
 - 3. Lawn Soil Mix.
 - 4. Stabilized Lawn Soil Mix.

- B. Related Sections:
 - 1. Section 02312, Planting Area Finish Grading.
 - 2. Section 02631, Landscape Drainage.
 - 3. Section 02810, Irrigation.
 - 4. Section 02921, Lawn Sodding.
 - 5. Section 02930, Planting Materials.
 - 6. Section 02931, Trees.
 - 7. Section 02935, Landscape Maintenance Period.
 - 8. Section 02936, Landscape Maintenance Period for Trees.

- C. Products Supplied but Not Installed under this Section: Lawn Soil Seed Mix.

1.2 REFERENCES

- A. ASTM — ASTM International:
 - 1. D 1557 — Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort.
 - 2. C 136 — Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 - 3. D 854 — Test Method for Specific Gravity of Soils.
 - 4. D 2974 — Test Methods for Moisture, Ash, and Organic Matter of Peat and Other Organic Soils.
 - 5. D 3665 — Practice for Random Sampling of Construction Materials.
 - 6. D 4427 — Classification of Peat Samples by Laboratory Testing.
 - 7. F 1632 — Test Method for Particle Size Analysis and Sand Shape Grading of Golf Course Putting Green and Sports Field Root Zone Mixes.
 - 8. F 1647 — Test Method for Organic Matter Content of Putting Green and Sports Turf Root Zone Mixes.

- B. USDA — United States Department of Agriculture:
 - 1. Soil Texture Triangle Classification.
 - 2. Handbook No. 60.

- C. Tests Developed by Turf Diagnostics & Design:
 - 1. Water Release Characterization Test.
 - 2. USDA Particle Size Analysis.
 - 3. Infiltration Rate.

1.3 DEFINITIONS

- A. Acceptance, Acceptable, or Accepted: Acceptance by the Landscape Architect in writing.
- B. Excessive Compaction: Planting area soil or soil mix compaction greater than 75 percent maximum dry density as determined by ASTM D 1557.
- C. Agronomist: Agronomist employed by the Landscape Architect for the Project.
- D. Arborist: Arboricultural consultant employed by the Landscape Architect for the Project.
- E. On-Grade: On or over subgrade soil, not on or over a building structure.
- F. On-Structure: On or over a building structure.
- G. Job Mix Formula: Formula for soil mixes determined by Owner's Testing Laboratory by conducting tests on lab samples.
- H. SMP: Soil Matrix Potential.

1.4 SYSTEM DESCRIPTIONS

- A. Planter Soil Mix: Meets requirements specified for topsoil.
- B. Structural Planting Soil Mix:
 - 1. Fast-draining.
 - 2. Bridges over drain rock layer below without need for geotextile separator fabric.
 - 3. Compacted to provide solid aggregate-to-aggregate contact to provide structural support for paving slabs and foundations of structures and sculptures.
 - 4. Uniform blend of aggregate and organic amendment that provides a fertile growing medium in the voids between the aggregate that retains moisture and nutrients for vigorous long-term plant root growth.
 - 5. Growing medium is not excessively compacted so that plant root growth is inhibited.
- C. Lawn Soil Mix:
 - 1. Fast-draining.
 - 2. Bridges over structural planting soil mix below without need for geotextile soil separator fabric.
 - 3. Compacted enough to provide firm support for pedestrian traffic and occasional traffic of slow-moving equipment used to install and move sculptures, but not excessively compacted so that plant root growth is inhibited.
 - 4. Uniform blend of sand, and peat that provides a fertile growing medium which retains moisture and nutrients for vigorous long-term plant root growth.
- D. Stabilized Lawn Soil Mix:
 - 1. Fast-draining.
 - 2. Compacted enough to provide firm support for pedestrian traffic and occasional traffic of slow-moving equipment used to install and move sculptures, but not excessively compacted so that plant root growth is inhibited.

3. Uniform blend of sand, peat, and stabilizer fibers that provides a fertile growing medium which retains moisture and nutrients for vigorous long-term plant root growth.

1.5 SUBMITTALS

- A. General Requirements: Refer to Section 01300.
- B. Product Data:
 1. Chemical Additives.
 2. Fertilizers.
 3. Organic Amendments.
 4. Aggregate.
 5. Soil Stabilizer.
- C. Samples:
 1. Sand — 1 gallon directly to Owner's Testing Laboratory, 1/2 pint to Landscape Architect.
 2. Organic Amendment — 1 gallon directly to Owner's Testing Laboratory, 1/2 pint to Landscape Architect.
 3. Aggregate — 1 gallon directly to Owner's Testing Laboratory, 1/2 pint to Landscape Architect.
 4. Drain Rock — 1 gallon directly to Owner's Testing Laboratory, 1/2 pint to Landscape Architect.
 5. Peat — 1 gallon directly to Owner's Testing Laboratory, 1/2 pint to Landscape Architect.
 6. Soil Stabilizer — 1 quart directly to Owner's Testing Laboratory, 1/2 pint to Landscape Architect.
 7. Planter Soil Mix — 1 gallon directly to Owner's Testing Laboratory, 1/2 pint to Landscape Architect.
 8. Structural Planting Soil Mix — 1 gallon directly to Owner's Testing Laboratory, 1/2 pint to Landscape Architect.
 9. Lawn Soil Mix — 1 gallon directly to Owner's Testing Laboratory, 1/2 pint to Landscape Architect.
 10. Stabilized Lawn Soil Mix — 1 gallon directly to Owner's Testing Laboratory, 1/2 pint to Landscape Architect.
- D. Test Reports:
 1. Topsoil for Planter Soil Mix, with test date less than 2 weeks old.
 2. Organic Amendment, with test date less than 2 weeks old.
 3. Aggregate.
 4. Compaction Test Results.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Bulk Materials:
 1. Load, ship, handle, and store bulk materials in such a manner to protect them from damage and contamination from other construction materials, soil, rock, debris, and substances toxic to plants.
 2. Store materials on-site on a clean concrete surface or on geotextile fabric, and keep covered with geotextile fabric to protect against contamination.
 3. Erect dams if required to prevent run-off from draining into stored materials.
 4. Damaged and contaminated materials will be rejected.

- B. Packaged Materials:
 - 1. Deliver in original unopened factory containers with original labels intact and legible indicating the guaranteed chemical analysis.
 - 2. Meet manufacturer's requirements for storage and protection of materials on-site.
- C. Purchase Documentation:
 - 1. Fertilizer Purchase and Delivery Invoices.
 - 2. Chemical Amendment Purchase and Delivery Invoices.

1.7 QUALITY ASSURANCE

- A. Requirements of Regulatory Agencies:
 - 1. Meet requirements of applicable laws, codes, and regulations required by authorities having jurisdiction over Work.
 - 2. Provide for inspections and permits required by Federal, State and local authorities in furnishing, transporting, and installing materials.
- B. Settlement Mock-Up: Mock-up areas of soil mixes at the specified depths and apply irrigation to induce settlement, if required to help determine the amount of settlement which will be caused by irrigation and rain.
- C. Structural Planting Soil Mix Mock-up:
 - 1. Install two 10 feet wide by 15 feet long 6-inch lifts of structural planting soil mix.
 - 2. Utilize mock-up to determine the minimum compaction standard for the remainder of the work.
- D. Lawn Soil Mix and Stabilized Lawn Soil Mix Mock-up:
 - 1. Install one 20-foot by 20-foot by 12-inch deep area of lawn soil mix and stabilized lawn soil over structural planting soil mix.
 - 2. Utilize mock-up to determine acceptable methods of pre-settlement and compaction and acceptable standard of surface smoothness.
- E. Soil Mix Preinstallation Meeting: Prior to preparation of the soil mix mock-ups, schedule and conduct a meeting with the Landscape Architect to review the purpose of the soil mixes; the purpose of the mock-up; the purpose of the compaction tests; the critical aspects of the soil mixing and soil mix installation; and required times for field visits by the Landscape Architect.

1.8 SITE CONDITIONS

- A. Environmental Requirements:
 - 1. Do not place or work soil mixes when moisture content is so great that excessive compaction will occur, nor when it is so dry that dust will form in the air or that clods will not break readily.
 - 2. Apply water, if necessary, to bring soil mixes to an optimum moisture content for tilling.
 - 3. Do not place or work soil mixes when muddy or frozen or during high winds.
 - 4. Do not apply chemicals if wind conditions will cause hazardous drift to people or property.
- B. Existing Conditions:

1. Prior to Work commencement review and clearly mark in field horizontal and vertical locations of existing public underground utilities and structures with respective utility companies.
2. Prior to Work commencement review and clearly mark in field horizontal and vertical locations of existing private underground utilities and structures with the Owner.

1.9 SEQUENCING AND SCHEDULING

- A. Lawn Soil Mix and Stabilized Lawn Soil Mix: Coordinate mixing and delivery with Section 02921 requirements.

PART 2 — PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS AND SUPPLIERS

- A. Sand for Lawn Soil Mix and Stabilized Lawn Soil Mix: Geo. Schofield Co., Inc., Bound Brook, N.J.; (732) 356-0858; www.geoschofield.com.
- B. Organic Amendment for Planter Soil Mix: Long Island Compost Corp., Yaphank, N.Y.; (631) 289-7260.
- C. Organic Amendment for Lawn Soil Mix and Stabilized Lawn Soil Mix:
1. Peat Inc., Elk River, Minn.; (800) 441-1880; www.peatinc.com.
 2. Accepted substitute.
- D. Aggregate for Structural Planting Soil Mix: Stalite Horticultural Aggregates, Salisbury, N.C.; (800) 898-3772; www.permatill.com.
- E. Soil Stabilizer for Stabilized Lawn Soil Mix: FRS, Inc. Baton Rouge, La.; (225) 752-7974; www.fibersoils.com.
- F. Fertilizers:
1. Roots, Inc., Independence, Mo.; (800) 342-6173; www.rootsinc.com.
 2. Vermi Technology Unlimited, Orange Lake, Fla; (352) 591-1111; www.vermitechnology.com.
 3. Kelly's Green Team, Newark, Mo.; (660) 627-5500; www.kellysgreenteam.com.
 4. Emerald Isle Ltd., Ann Arbor, Mich; (800) 628-4769; www.emeraldisle.com.

2.2 MATERIALS

- A. Sand for Lawn Soil Mix and Stabilized Lawn Soil Mix: Uniform, coarse silica sand, screened and washed, free of debris and stones, with an ASTM Uniformity Coefficient (Cu) of 2.0 to 3.5, and a D50 of 0.30 mm to 0.45 mm, and meeting the following size gradation:

<i>Soil Separate</i>	<i>Size (mm)</i>	<i>Allowable %</i>
Sand	0.05 to 2.0	≥ 91
Silt	0.05 to .002	≤ 3

<i>Soil Separate</i>	<i>Size (mm)</i>	<i>Allowable %</i>
Clay	<0.002	≤ 3

<i>Fraction Name</i>	<i>Size mm (US Sieve)</i>	<i>*Allowable %</i>
Course Gravel	>3.35 (6)	0
Fine Gravel	3.35 to 2.0 (6 to 10)	≤ 3
Very Course Sand	2.0 to 1.0 (10 to 18)	≤ 10
Course / Medium Sand	1.0 to 0.25 (18 to 60)	>60
Fines	0.25 to 0.05 (60 to 270)	≤20
Total Fractions	<0.25 (60)	≤21

<i>Miscellaneous Criteria</i>	<i>Units</i>	<i>Criteria</i>
Coefficient of Uniformity (Cu)	No units	2.0 to 3.5
D50	mm	0.30 to 0.45

*Percent Retained within Individual Size Range.

Calcareous sands and gravel are not acceptable.

B. Organic Amendment for Planter Soil Mix:

1. Humus material shall have an acid-soluble ash content of no less than 5 percent and no more than 20 percent.
2. The pH of the material shall be between 6 and 7.5.
3. The salt content shall be less than 10 millimho/cm at 25 degrees C on a saturated paste extract.
4. Boron content of the saturated extract shall be less than 1.0 part per million
5. Silicon content (acid-insoluble ash) shall be less than 50 percent.
6. Calcium carbonate shall not be present if the amendment is to be applied on alkaline soils.
7. Types of acceptable products are composts, manures, mushroom composts, straw, alfalfa, sludge, peat mosses, etc., low in salts, low in heavy metals, free from weed seeds, free of pathogens and other deleterious materials.
8. Composted wood products are conditionally acceptable (stable humus must be present). Wood-based products are not acceptable which are based on redwood or cedar.
9. Sludge-based materials are not acceptable if the soil already has a high level (toxic level) of zinc, copper, or other heavy metals based on soil analysis.
10. Carbon-nitrogen ratio shall be less than 25:1.
11. The compost shall be aerobic without malodorous presence of decomposition products.
12. The maximum particle size shall be 0.5-inch and 80 percent or more shall pass a No. 4 screen for mixing with soil. The maximum particle size for applying via hydroseeding machine shall be 0.25-inch.

13. Maximum total permissible pollutant concentrations in organic amendment in parts per million on a dry-weight basis:

Arsenic:	20
Cadmium:	15
Chromium:	30
	0
Cobalt:	50
Copper:	15
	0
Lead:	20
	0
Mercury:	10
Molybde- num:	60
Nickel:	10
	0
Selenium:	50
Silver:	10
Vanadium:	20
	0
Zinc:	30
	0

Higher amounts of salinity or boron may be present if the soils are to be pre-leached to reduce the excess or if the plant species will tolerate the salinity and/or boron.

14. From 45- to 65-percent moisture measured via wet-weight basis.
15. Free of stones and debris.
16. Tests 5 to 8 on Solvita Test.

- C. Organic Amendment for Lawn Soil Mix and Stabilized Lawn Soil Mix: Processed peat, conforming to ASTM D4427 as modified herein, shredded and granulated to pass sieve analysis and conditioned in a storage pile for a minimum of 6 months after excavation, free of sticks, stones, and other debris, conforming to the following criteria:

Organic matter: 85% minimum by weight as determined by loss on ignition (ASTM D2974, Method D)

Total ash: 15% or less

pH: 5.0 – 7.5

Percent moisture (wet-weight basis): 30% – 50%

Sieve size 2.0mm: 90% – 100% passing

Sieve size 1.0mm: 70% – 90% passing

- D. Aggregate for Structural Planting Soil Mix: Washed and graded lightweight aggregate of expanded shale meeting the following size gradation, stability criteria, bridging criteria, and permeability requirements:

<i>US Standard Sieve Size</i>	<i>Cumulative Percent Passing</i>
1/2 inch	100
3/8 inch:	80–100
1/4 inch	5–40
No. 8	0–20
No. 16	0–10

<i>Test Method</i>	<i>Criteria</i>
Sulfate Soundness (ASTM C-88):	Not to exceed 12% loss
LA Abrasion (ASTM C-131):	Not to exceed 40
Unit Dry Weight Loose (ASTM C 29)	48–55 pounds per cubic foot

Bridging Criteria

D15 Structural Planting Soil Mix $\geq 8 \times$ D85 Lawn and Ground Cover Soil Mix

Permeability Requirements

D15 Structural Planting Soil Mix $\leq 5 \times$ D15 Lawn and Ground Cover Soil Mix

- E. Drain Rock: Washed stone meeting the following size gradation, stability criteria, bridging criteria, and permeability requirements:

<i>US Standard Sieve Size</i>	<i>Percent Passing</i>
1/2 inch (12.5 mm):	100.0
10 (2.0):	0.0 – 10.0
18 (1.0):	0.0 – 5.0

<i>Test Method</i>	<i>Criteria</i>
Sulfate Soundness (ASTM C-88):	Not to exceed 12% loss
LA Abrasion (ASTM C-131):	Not to exceed 40

Bridging Criteria

D15 Drain Rock $\leq 8 \times$ D85 Lawn and Ground Cover Soil Mix

Permeability Requirements

D15 Drain Rock $\geq 5 \times$ D15 Lawn and Ground Cover Soil Mix

- F. Fertilizers:
1. Roots "M-Roots" with mycorrhiza 3-3-3.
 2. Emerald Isle SeaBlend 12-1-12.
 3. Vermi Technology Pure Black Castings.
 4. Kelley's Green Team Gypsum Fairway Pellets, 76-percent calcium sulphate dehydrate, 17-percent calcium; 14-percent sulphur, derived from mined gypsum, less than 1-percent moisture content.
 5. Kelly's Green Team Capsulated Dolomitic Limestone Pellets.
- G. Soil Stabilizer: Sportgrids 36MLTF conforming to the following:

<i>Property</i>	<i>Test Method</i>	<i>Typical Values</i>
Polypropylene:	ASTM D4101 / Group 1 / Class 1 / Grade 2	99%
Color:	—	Tan
Moisture Absorption:	—	Nil
Fiber Length:	Measured	0.5-inch and 0.75-inch minimum
Specific Gravity:	ASTM D 792	0.91 gr/cm ³
Carbon Black Content:	ASTM D 1603	N/A
Tensile Strength:	ASTM D 2256	30,000 PSI minimum
Tensile Elongation:	ASTM D 2256	20% maximum
Young's Modulus:	ASTM D 2101	500,000 PSI minimum

- H. Topsoil for Planter Soil Mix:
1. General: Topsoil shall be friable and have sufficient structure in order to give good tilth and aeration to the soil. When amended, fertilized, and conditioned, the soil must be friable, be well drained, and be supportive of vigorous plant growth. It must contain low concentrations of inhibitory constituents. Plant growth of dicots and monocots must be at least 80 percent of a known reference soil, free of inhibitory constituents. A soil containing inhibitory constituents will be deemed to be suitable if the inhibitory constituents can be properly counteracted. The soil must have sufficient moisture retention and nutrient retention to avoid excessive frequency of irrigation and frequency of fertilizer application. The soil must be clean and free of excessive gravel, rock, and physical impurities.
 2. Deleterious Materials: Free of roots, clods, stones larger than 1 inch in the greatest dimension, pockets of coarse sand, noxious weeds, sticks, lumber, brush, and other debris.
 3. Disease-causing Organisms: Free of infestation of nematodes or other undesirable disease-causing organisms such as insects and plant pathogens.
 4. Gradation: Sandy loam as classified by the USDA Soil Texture Triangle classification method.

5. Permeability Rate: Hydraulic conductivity rate shall be not less than 1 inch per hour, nor more than 20 inches per hour when tested in accordance with the USDA Handbook, No. 60, Method 34B or other accepted methods.
6. Fertility: The range of the essential elemental concentration in soil shall be as follows:

<i>Ammonium Bicarbonate / DTPA Extraction</i>	
<i>Parts per million (mg/kg dry-weight basis)</i>	
Phosphorus:	2.0 – 40.0
Potassium:	40.0 – 220.0
Iron:	2.0 – 35.0
Manganese:	0.3 – 6.0
Zinc:	0.6 – 8.0
Copper:	0.1 – 5.0
Boron:	0.2 – 1.0
Magnesium:	50.0 – 150.0
Sodium:	0 – 100.0
Sulfur:	25.0 – 500.0
Molybdenum:	0.1 – 30.0

7. Acidity: 6.0 – 7.9 soil pH range measured in the saturation extract (Method 21a, USDA Handbook No. 60).
8. Salinity: 0.5 – 2.0 dS/m salinity range measured in the saturation extract (Method 3a, USDA Handbook No. 60). If calcium and if sulfate ions both exceed 20 milliequivalents per liter in the saturation extract, the maximum salinity shall be 4.0 dS/m.
9. Chloride: 150 mg/liter (parts per million) maximum concentration of soluble chloride in the saturation extract (Method 3a, USDA Handbook No. 60).
10. Boron: 1-mg/liter (parts per million) maximum concentration of soluble boron in the saturation extract (Method 3a, USDA Handbook No. 60).
11. Sodium Adsorption Ratio (SAR): Maximum of 3 measured per Method 20b, USDA Handbook No. 60.
12. Soil Organic Matter Content: Sufficient soil organic matter present to impart good physical soil properties, but not be excessive to cause toxicity or cause excessive reduction in the volume of soil due to decomposition or organic matter.
13. Calcium Carbonate Content: No free calcium carbonate (limestone) present.
14. Available Aluminum: Less than 5 parts per million measured with the Ammonium Bicarbonate/DTPA Extraction.
15. Heavy Metals: The maximum permissible elemental concentration in the soil shall not exceed the following:

<i>Ammonium Bicarbonate / DTPA Extraction</i>	
<i>Parts per million (mg/kg dry-weight basis)</i>	
Arsenic	2.0
Cadmium	2.0
Chromium	10.0
Cobalt	2.0
Lead	30.0
Mercury	1.0
Nickel	5.0
Selenium	3.0

<i>Ammonium Bicarbonate</i>	
<i>/ DTPA Extraction</i>	
<i>Parts per million (mg/kg</i>	
<i>dry-weight basis)</i>	
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Silver	0.5
Vanadium	3.0

If the soil pH is between 6.0 and 7.0, the maximum permissible elemental concentration shall be reduced 50 percent. If the soil pH is less than 6.0, the maximum permissible elemental concentration shall be reduced 75 percent. No more than three metals shall be present at 50 percent or more of the above values.

16. Phytotoxic Constituent, Herbicides, Hydrocarbons, etc.: Total petroleum hydrocarbons shall not exceed 50 mg/kg dry soil measured per the modified EPA Method No. 8015. Total aromatic volatile organic hydrocarbons (benzene, toluene, xylene and ethylbenzene) shall not exceed 2 mg/kg dry soil measured per EPA Method No. 8020.

2.3 MIXES

- A. Planter Soil Mix:
 1. Mix to Establish Bid: 15-percent organic amendment by volume, 85 percent topsoil by volume, 100 pounds of Pure Black Castings per ton of mix.
 2. Final Mix for Construction: Job Mix Formula determined by Owner's Testing Laboratory.
- B. Structural Planting Soil Mix:
 1. Mix to Establish Bid: 11 parts aggregate, 9 parts lawn soil mix, 200 pounds Pure Black Castings per ton of mix.
 2. Final Mix for Construction: Job Mix Formula determined by Owner's Testing Laboratory.
- C. Lawn Soil Mix:
 1. Mix to Establish Bid: One part organic amendment (peat) to 9 parts sand by volume.
 2. Final Mix for Construction: Job Mix Formula determined by Owner's Testing Laboratory.
- D. Stabilized Lawn Soil Mix:
 1. Mix to Establish Bid: One part organic amendment (peat) to 9 parts sand by volume, and 6 pounds of soil stabilizer per ton of lawn soil mix.
 2. Final Mix for Construction: Job Mix Formula determined by Owner's Testing Laboratory.
- E. Mixing of Soil Mixes:
 1. Blend materials off-site in a clean area using an experienced blending operator.
 2. Blend materials via method acceptable to the Owner's Testing Laboratory.
 3. Do not blend materials that are saturated or contain excessive free water.
 4. Uniformly blend materials so that they are evenly distributed throughout mixtures.
 5. Protect materials and mixtures from contamination prior to, during, and after mixing operations.
 6. Store mixes in stockpiles prior to shipment to site in clean areas protected from contamination by other materials.

7. For stabilized lawn soil mix, blend stabilizer into lawn soil mix after lawn soil mix has been prepared.

2.4 SOURCE QUALITY CONTROL

- A. Pre-mixing Testing to Verify Particle-size Distribution of Materials:
 1. Submit one 1-gallon composite sample each of sand, peat, organic amendment, aggregate, and drain rock to the Owner's Testing Laboratory prior to blending materials.
 2. Collect samples via sample-collection procedure described below.
 3. Do not purchase materials until materials are accepted.

- B. Sample Collection Procedure:
 1. Collect a minimum of eight samples to make up the composite sample for each material sample to be submitted.
 2. Take samples from random locations in the stockpile varying from the top to the bottom and around the stockpile.
 3. Take at least half the samples from the lower third of the stockpile.
 4. Remove outer 6 inches of material from stockpile surface and push a clean PVC pipe as far as possible into the pile, pull out the pipe, and tap the sample material into a clean bucket.
 5. Cut the end of the PVC pipe at a 45-degree angle to make pushing the pipe into the stockpile easier.
 6. Thoroughly mix material in bucket after samples are taken.
 7. Remove 1 gallon of material from bucket and fill a zip-lock plastic bag.
 8. Double bag the composite sample and label the bag with a permanent marker indicating the material name, date sample was taken, and from which stockpile sample was taken.

- C. Pre-construction Testing to Determine Job Mix Formula for Planter Soil Mix: Upon acceptance of the topsoil, and organic amendment, the Owner's Testing Laboratory will perform tests using ASTM standards indicated above to design a mix which meets the following criteria:

<i>Item</i>	<i>Criteria</i>
Infiltration Rate* (K-SAT) at 20°C:	3 – 10 inches per hour
Bulk Density:	1.2 – 1.5 gr / cm ³
Total Porosity:	42% – 55%
Water Retention* at 0 – 75 cm SMP:	Minimum 35% saturation loss
Water Release* at 0 – 700 cm SMP:	Minimum value 40% saturation
Organic Matter** (Dry Weight):	1.1% – 1.7% (range only)

*TDD-developed Test.

**ASTM F1647 Method A.

SMP: soil matrix potential.

- D. Preconstruction Testing to Determine Job Mix Formula for Structural Planting Soil Mix:
 1. Upon acceptance of sand, organic amendment, aggregate, and drain rock materials, the Owner's Testing Laboratory will test the materials using ASTM stan-

Standards indicated above to design a Job Mix Formula which meets the following criteria:

<i>Item</i>	<i>Criteria</i>
Infiltration Rate (K-SAT):	8 – 40 inches per hour
Bulk Density:	0.8 – 1.3 grams / cm ³
Total Porosity:	41% – 65%
Saturation Percentage at -1/3 Bar Tension:	30% – 50%
Organic Matter (Dry Weight):	2% – 10%

2. Particle size analysis and organic-matter content of the mix will be used to define the quality-control program.
3. The accepted laboratory-prepared mix will be evaluated for exchangeable and water-soluble nutrient analysis to establish calcium source and applicable rate.
4. The Owner's Testing Laboratory will compare this laboratory-prepared mix to subsequent mix samples submitted by the Contractor.

- E. Preconstruction Testing to Determine Job Mix Formula for Lawn Soil Mix: Upon acceptance of the sand, peat, soil stabilizer, and structural planting soil mix materials, the Owner's Testing Laboratory will test the materials using ASTM standards to design a Job Mix Formula which meets the following criteria:

<i>Item</i>	<i>Criteria</i>
Infiltration Rate* (K-SAT) at 20°C:	15 – 25 inches per hour
Bulk Density:	1.5 – 1.7 gr / cm ³
Total Porosity:	35% – 45%
Water Retention* at 0 – 75 cm SMP:	Minimum 60% saturation loss
Water Release* at 0 – 700 cm SMP:	Minimum value 15% saturation
Organic Matter** (Dry Weight):	0.5% – 0.9% (range only)

*TDD-developed Test.
 **ASTM F1647 Method B.
 SMP: soil matrix potential.

- F. Mix Testing Prior to Shipment of Soil Mixes to Site:
1. After blending each mix as prescribed by the respective Job Mix Formulas, submit to the Owner's Testing Laboratory one 1-gallon composite sample representing the first 600 tons of each soil mix.
 2. Send the Landscape Architect a copy of the transmittal via facsimile.
 3. The Owner's Testing Laboratory will evaluate these mix samples using ASTM F1647 Method A or B standards comparing them to the pre-construction laboratory-prepared mixes designed by the Owner's Testing Laboratory.
 4. The Owner's Testing Laboratory will send test results to the Landscape Architect for review and, upon acceptance by Landscape Architect, the mix may be shipped to the site.

5. After acceptance of the first 600 tons of each soil mix blended, submit to the Owner's Testing Laboratory one 1-gallon composite sample representative of every subsequent 600 tons of each soil mix blended prior to shipment to site.
 6. The Owner's Testing Laboratory will compare the subsequent samples with the laboratory-prepared samples for organic content via visual inspection only, unless visual inspections suggest additional testing is required.
 7. The Owner's Testing Laboratory will send the subsequent test results to the Landscape Architect for review and, upon Contractor's receipt of acceptance by the Landscape Architect, the mix may be shipped to the site.
- G. Stabilized Lawn Soil Mix Fiber Quantity Testing Prior to Shipment to Site:
1. After completion of stabilizer incorporation into lawn soil mix, submit three 1-gallon composite samples from soil mix to Owner's Testing Laboratory for fiber quantity test.
 2. Collect soil from 10 random locations to make up each composite sample.
 3. Owner's Testing Laboratory will test to verify that weight of the fiber is between 0.30 percent and 0.45 percent of soil mix dry weight.
- H. Pre-shipment Testing Payment:
1. Owner will pay for initial testing.
 2. Contractor shall pay for tests that must be repeated due to samples failing a test or due to a material supply shortage.
- I. Owner's Testing Laboratory: Turf Diagnostics & Design, Inc., Linwood, Kans.; (913) 723-3700; www.turfdiag.com.

PART 3 — EXECUTION

3.1 EXAMINATION

- A. General: Examine site and verify that conditions are suitable to receive Work and that no defects or errors are present which would cause defective installation of products or cause latent defects in workmanship and function.
- B. Subgrade: Verify that the subgrade is at the correct elevation and slope.
- C. Underground Utilities and Structures: Verify that the locations of utilities, structures and other underground items have been clearly marked.
- D. Notification of Unsuitable Conditions: Before proceeding with Work, notify the Owner in writing of unsuitable conditions and conflicts.

3.2 PREPARATION

- A. Protection of Existing Conditions:
 1. Use every possible precaution to prevent damage to existing conditions to remain such as structures, utilities, plant materials and walks on or adjacent to the site of the Work.
 2. Provide barricades, fences or other barriers to protect existing conditions to remain from damage during construction.
 3. Do not store materials or equipment, permit burning, or operate or park equipment under the branches of existing plants to remain.

4. Submit written notification of damaged plants and structures to the Owner immediately.
- B. On-Grade Subgrade Preparation:
 1. Inspect soil surface for sticks, oils, chemicals, plaster, concrete, and other deleterious materials.
 2. Do Work required to remove and dispose of the deleterious materials.
- C. On-Structure Substrate: Remove and dispose of deleterious materials.

3.3 STRUCTURAL PLANTING SOIL MIX PLACEMENT

- A. Placement:
 1. Place mix carefully avoiding damage or displacement of other materials such as walls, paving, waterproof membrane, protection board, drain rock, geotextile fabric, and irrigation piping.
 2. Do not mix subgrade soils or construction materials with soil mix.
 3. Remove soil mix contaminated with subgrade soil, construction materials, or debris.
 4. Place soil mix to depths, elevations, and profiles indicated on the Drawings.
- B. Compaction:
 1. Place soil mix in 6-inch lifts.
 2. Compact each lift to 95 percent of maximum density achievable in on-site compaction mock-up.
- C. Settlement Repair: Fill settled low areas with soil mix and repeat compaction and filling process until settlement ceases.
- D. Fertilizer Application after Soil Mix Placement:
 1. Apply gypsum pellets at rate of 20 pounds per 1,000 square feet.
 2. Apply 3-3-3 at rate of 20 pounds per 1,000 square feet.
 3. Uniformly spread half of each fertilizer in one direction, and spread other half of each fertilizer in direction 90 degrees to direction that first half was spread.
 4. Sprinkle surface of soil mix with 2 inches of water after application of fertilizers.

3.4 LAWN SOIL MIX AND STABILIZED LAWN SOIL MIX PLACEMENT

- A. Placement:
 1. Place mix carefully, avoiding damage of other materials such as walls, paving, mow bands, waterproof membranes, protection boards, drain mat, geotextile fabric, irrigation piping.
 2. Deposit soil mix at edge of planting area without running over soil mix with delivery vehicle, and spread out soil mix with a small track-type tractor.
 3. Do not operate vehicles or equipment with a load rate greater than 5 pounds per square inch over subdrain lines, drain-rock areas, or on soil mix.
 4. Do not leave wheel ruts on surface of structural planting soil mix.
 5. Do not contaminate soil mix with subgrade soil, structural soil mix aggregate, construction materials, or debris.
 6. Remove contaminated soil mix from site.
 7. Place an 8-inch deep lift of lawn soil mix over the surface of the structural planting soil mix following by pre-settlement operations and compaction rolling.

8. Place a 4-inch deep lift of stabilized lawn soil mix over the surface of the lawn soil mix followed by pre-settlement and compaction operations.
 9. Pre-settle and compact each soil mix lift by saturating with water, allowing to dry, filling with additional soil mix, raking smooth, rolling and repeating this work until settlement ceases.
 10. Compact each soil mix lift by rolling to a maximum dry bulk density of not less than 87 pounds per cubic foot and not more than 100 pounds per cubic foot as determined by ASTM D1557.
 11. Install stabilized lawn soil mix to have a smooth surface at the elevations indicated on the Drawings after pre-settlement and compaction.
- B. Fertilizer Application after Stabilized Lawn Soil Mix Placement:
1. Apply 12-1-12 at rate of 1 pound of actual nitrogen per 1,000 square feet, and apply dolomitic limestone at rate of 35 pounds per 1,000 square feet no more than 2 days before sod installation.
 2. Apply Pure Black Castings at rate of 50 pounds per 1,000 square feet no more than 2 days before sod installation.
 3. Uniformly spread half of each fertilizer over surface of soil mix in one direction, and spread other half of each fertilizer in direction 90 degrees to direction that first half was spread.
 4. After applying fertilizers, lightly and uniformly water soil mix, but do not soak.
 5. Do not apply fertilizers more than 2 days prior to sod installation.
 6. Do not apply fertilizers if rain is predicted before the sod can be installed over the area fertilized.

3.5 PLANTER SOIL MIX PLACEMENT

- A. Placement:
1. Place soil mix carefully, avoiding damage of other materials such as walls, paving, mow bands, waterproof membranes, protection boards, drain mat, geotextile fabric, irrigation piping.
 2. Deposit soil mix at edge of planting area without running over soil mix with delivery vehicle, and spread out soil mix manually or with a small track-type tractor.
 3. Do not operate vehicles or equipment with a load rate greater than 5 pounds per square inch over subdrain lines, drain-rock areas, or on soil mix.
 4. Do not leave wheel ruts on subgrade.
 5. Do not contaminate soil mix with subgrade soil, other construction materials, or debris.
 6. Remove contaminated soil mix from site.
 7. Place soil mix to depths, elevations, and profiles indicated on the Drawings.
 8. Pre-settle soil mix by applying 4 inches of water.
 9. Do not allow soil mix to become compacted more than 75 percent relative density as determined by ASTM D1557.

3.6 FIELD QUALITY CONTROL

- A. Soil Mix Inspection upon Delivery:
1. The Owner's Testing Laboratory representative will visually inspect each load of each soil mix delivered to the site.
 2. Submit one 1-gallon representative composite sample to Owner's Testing Laboratory if load appears to be different from a uniform mix as determined by the Owner's Testing Laboratory representative.

- B. Testing Payment:
 - 1. If the visual analysis of on-site mixes indicates a potential change in material quality or variance in the mix, additional testing will be required.
 - 2. If the sample from on-site passes the tests resulting from the visual analysis, the Owner will pay for the tests.
 - 3. If a sample from on-site fails the tests resulting from visual analysis, the Contractor shall pay for the tests.
 - 4. If a sample from on-site fails, immediately stop placement of soil mix until acceptance to continue is received from the Landscape Architect.

- C. Owner's Testing Laboratory: Turf Diagnostics & Design, Inc., Linwood, Kans.; (913) 723-3700; www.turfdiag.com.

- D. Structural Planting Soil Mix Compaction Tests:
 - 1. Schedule the Geotechnical Engineer to perform nuclear density field tests on compacted mock-up area lift of structural planting soil mix to determine maximum density reading achievable for compaction of structural planting soil mix.
 - 2. Schedule the Geotechnical Engineer to perform nuclear density field tests after each lift of installed structural planting soil mix is compacted to verify compaction meets or exceeds 95 percent of maximum density achieved in mock-up area.

- E. Lawn Soil Mix Compaction Tests:
 - 1. Schedule Geotechnical Engineer to perform nuclear density field tests on lawn soil mix after installation to verify compaction requirements are met.
 - 2. Have Geotechnical Engineer perform at least 1 compaction test for every 4,000 square feet.

- F. Tests for Excessive Compaction of Planter Soil Mix:
 - 1. Where excessive compaction is suspected by Landscape Architect, have Geotechnical Engineer perform nuclear density field tests.
 - 2. Correct excessively compacted soil areas to the depth of the excessive compaction by means and methods acceptable to the Landscape Architect prior to installing plant material.

3.7 PROTECTION

- A. Soil Mix Contamination:
 - 1. Protect installed soil mixes from contamination by other construction materials, soil, rocks, run-off, debris, substances toxic to plants, and other elements which will affect the permeability and fertility of the soil mixes.
 - 2. Cover soil mixes with geotextile fabric or other acceptable means to prevent contamination.

- B. Soil Mix Displacement and Excessive Compaction: Where vehicular traffic and concentrated foot traffic must travel over the soil mixes, protect installed soil mixes from excessive compaction by covering with 3/4" structural grade plywood or other acceptable covering.

END OF SECTION

SECTION 02930
PLANTING MATERIALS

PART 1 — GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Ground Cover.
 - 2. Wood Chip Mulch.

- B. Related Sections:
 - 1. Section 02312, Planting Area Finish Grading.
 - 2. Section 02810, Irrigation.
 - 3. Section 02910, Planting Soil Preparation.
 - 4. Section 02912, Structural Planting Soil Mix.
 - 5. Section 02921, Lawn Sodding.
 - 6. Section 02931, Trees.
 - 7. Section 02935, Landscape Maintenance Period.
 - 8. Section 02936, Landscape Maintenance Period for Trees.

1.2 REFERENCES

- A. ASTM — ASTM International: D 1557 — Test Method for Laboratory Compaction Characteristics of soil Using Modified Effort.
- B. ICBN — International Code of Botanical Nomenclature.
- C. ICNCP — International Code of Nomenclature of Cultivated Plants.

1.3 DEFINITIONS

- A. Acceptance, Acceptable, or Accepted: Acceptance by the Landscape Architect in writing.
- B. Excessive Compaction: Planting area soil or soil mix compaction greater than 75 percent of maximum dry density as determined by ASTM D 1557.
- C. On-Grade: On or over subgrade soil, not on or over a building.
- D. On-Structure: On or over a building structure.

1.4 SUBMITTALS

- A. Samples: Wood Chip Mulch — 1/2-pound bag.
- B. Plant Material Photographs:
 - 1. At least 14 days prior to submittal of plant material location data, submit three color photographs each of representative plants of each type of plant material.
 - 2. Include a measuring rod in each photograph to clearly indicate plant heights.

- C. Plant Material Location Data:
 - 1. Quantities and sizes of each plant material type at each nursery or other place of growth.
 - 2. Address, phone number, and contact person for each nursery or other place of growth.

1.5 QUALITY ASSURANCE

- A. Regulatory Requirements: Provide for inspections and permits required by federal, state, and local authorities in furnishing, transporting, and installing materials.

1.6 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Handling Plants:
 - 1. Do not lift or handle container plants by tops, stems, or trunks.
 - 2. Do not bind or handle plants with wire or rope.
 - 3. Pad trunk and branches where hoisting cables or straps contact.
- B. Anti-Desiccant:
 - 1. Spray plant material in full leaf immediately before transporting with anti-desiccant.
 - 2. Meet requirements of anti-desiccant manufacturer's current printed application instructions.
- C. Plant Storage Prior to Installation:
 - 1. Protect plant root balls from sun and drying winds.
 - 2. Keep root balls moist.
 - 3. Keep sun-sensitive plants shaded.
 - 4. Anchor plants to prevent damage from strong winds.

1.7 SITE CONDITIONS

- A. Environmental Requirements: Protect plant material being stored on site from sun and drying winds.
- B. Existing Conditions:
 - 1. Prior to Work commencement, review and clearly mark in field horizontal and vertical locations of public existing underground utilities and structures with respective utility companies.
 - 2. Prior to Work commencement, review, and clearly mark in field horizontal and vertical locations of private underground utilities and structures with the Owner's Representative.

1.8 WARRANTY

- A. General: Warrant that plant material will be healthy and in a vigorous, flourishing condition of active growth, one year from date of Final Completion.
- B. Delays: Delays in completion of planting operations which extend the planting into more than one planting season shall extend the Warranty Period correspondingly.
- C. Condition of Plants: Plants shall be free of dead or dying branches and branch tips, with foliage of a normal density, size and color.

- D. Incorrect Materials:
 - 1. During Warranty Period, replace at no additional cost to the Owner, plants revealed as being untrue to name.
 - 2. Provide replacements of a size and quality to match the planted materials at the time the mistake is discovered.

- E. Replacements:
 - 1. As soon as weather and seasonal conditions permit, replace, without additional cost to the Owner, dead plants and plants not in a vigorous, thriving condition, as determined by the Landscape Architect's horticultural consultant during the Warranty Period.
 - 2. Apply requirements of this Section to replacements, except Warranty requirements.

1.9 MAINTENANCE

- A. Maintenance Service: Refer to Section 02935.

PART 2 — PRODUCTS

2.1 SUBSTITUTIONS

- A. Plant Material: Accepted substitute plants shall be true to species and variety and shall meet requirements of this Section except that plants larger than specified may be used, if accepted by the Landscape Architect, and if without additional cost to the Owner.

2.2 MATERIALS

- A. Plant General Requirements:
 - 1. Growing Practices: Nursery grown in accordance with best horticultural industry practices.
 - 2. Nomenclature: Plant nomenclature shall meet requirements of ICBN and ICNCP.
 - 3. Climatic Growing Conditions: Grown under climatic conditions similar to those of project for at least two years unless otherwise accepted by the Landscape Architect.
 - 4. Container Growth Limitations: Container stock excluding annuals shall have been grown in the containers in which delivered for at least six months, but not over two years.
 - 5. Vigor: Sound, healthy and vigorous, well branched and densely foliated when in leaf.
 - 6. Disease and Pests: Free of disease, insect pests, eggs, or larvae.
 - 7. Root System: Healthy well-developed root systems, free of kinked, circling, girdling and center roots, root-bound condition and cracked or broken root balls.
 - 8. Plant Size: Measure plants when branches are in their normal upright position.
 - 9. Pruning: Do not prune, thin or shape plants before delivery without acceptance by the Landscape Architect.

- B. Wood Chip Mulch: Chipped or tub-ground hardwood that has been composted at least six months prior to application in a manner to sufficiently suppress disease organisms and weed seeds and provide visual indications that it has begun to decay, maximum 1-

inch by 3-inch size pieces and no more than 25 percent of the pieces less than 1/4-inch by 1/4-inch.

- C. Anti-Desiccant: Commercially available spray protective coating, designed to reduce plant transpiration loss, which produces a moisture retarding barrier not removable by rain or snow.

2.3 MIXES

2.4 SOURCE QUALITY CONTROL

- A. Advanced Tree Procurement:
 - 1. Within 60 days Landscape Architect in writing of the availability or lack thereof of the specified plant material.
 - 2. Procure plant material and arrange for contract growing as required to ensure that plant material is available in the quantities and sizes specified, and of the quality specified, at time of installation.
 - 3. Verify plant branching requirements with Landscape Architect prior to contract growing.
 - 4. Landscape Architect will review advanced procured plant material prior to initial purchase and at end of the first growing season.
 - 5. Prior to delivery of advanced procured plant material to site, coordinate and schedule a final review of the plant material at the place of growth.
 - 6. Review and acceptance of the advance-procured plant material at the place of growth does not cancel the right of the Landscape Architect to reject plant material at the site, if damage or unacceptable conditions are found that were not detected at the place of growth.
- B. Plant Material Review and Tagging:
 - 1. Plants will be reviewed and photographed by the Landscape Architect at the nursery, or other place of growth prior to delivery of plant material to site.
 - 2. Acceptance of plant material at the nursery or place of growth does not cancel the right of the Landscape Architect to reject plant material at the site, if damage or unacceptable conditions are found that were not detected at the nursery, place of growth, or in the submitted photographs.

PART 3 — EXECUTION

3.1 EXAMINATION

- A. General: Examine site and verify that conditions are suitable to receive Work and that no defects or errors are present which would cause defective installation of products or cause latent defects in workmanship and function.
- B. Finish Grading and Soil Preparation: Verify that finish grading and soil preparation Work is complete.
- C. Verification Surface Drainage: Verify positive surface drainage of planted areas.
- D. Notification: Before proceeding with Work, notify the Owner's Representative in writing of unsuitable conditions.

3.2 PREPARATION

- A. Protection of Existing Conditions:
 - 1. Use every possible precaution to prevent damage to existing conditions to remain such as structures, utilities, plant materials and walks on or adjacent to the site of the Work.
 - 2. Use every possible precaution to prevent excessive compaction of planting area soil or soil mixes within or adjacent to the areas of Work.
 - 3. Provide barricades, fences or other barriers to protect existing conditions to remain from damage during construction.
 - 4. Do not store materials or equipment, permit burning, or operate or park equipment under the branches of existing plants to remain.
 - 5. Submit written notification of damaged plants and structures to the Owner's Representative immediately.

3.3 PLANTING AND BACKFILL OPERATIONS

- A. Protection of Plants Prior to Installation:
 - 1. Protect plant root balls from sun or drying winds.
 - 2. Keep root balls of plants that cannot be planted immediately upon delivery in the shade, well-protected and well-watered.
- B. Installation: Install ground cover plants as indicated on the Drawings.

3.4 WOOD CHIP MULCH INSTALLATION

- A. Depth: Install a 1-inch depth continuous mulch layer over ground cover areas, except where indicated otherwise.
- B. Surface: Rake mulch surface smooth.
- C. Woody Plant Stems: Slope mulch away from woody plant stems so that mulch does not touch stems.

END OF SECTION

SECTION 02935

LANDSCAPE MAINTENANCE PERIOD

PART 1 — GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Monitoring and Maintenance of Ground Cover and Lawn Areas.
 - 2. Monitoring and Maintenance of Irrigation Systems.
 - 3. Maintenance of Wood Chip Mulch.

- B. Related Sections:
 - 1. Section 02312, Planting Area Finish Grading.
 - 2. Section 02810, Irrigation.
 - 3. Section 02910, Planting Soil Preparation.
 - 4. Section 02921, Lawn Sodding.
 - 5. Section 02930, Planting Materials.
 - 6. Section 02931, Trees.
 - 7. Section 02936, Landscape Maintenance Period for Trees.

- C. Unit Prices:
 - 1. Provide a unit price for each chemical application indicated under the Preliminary Chemical Application Schedule under Article 3.9 in this Section to establish a bid price.
 - 2. Provide a unit price for each fertilizer application based on the preliminary fertilization programs indicated in this Section to establish a bid price.
 - 3. Unit prices shall be applicable for the cost of additional chemical and fertilizer applications required beyond the quantity of applications included in the bid and shall be applicable for crediting the Owner for applications included in the bid price which are not required by the Landscape Architect.
 - 4. Credit Owner for any chemical or fertilizer applications included in the bid price which are not required by the Landscape Architect.

1.2 REFERENCES

- A. ICBN — International Code of Botanical Nomenclature.
- B. ICNCP — International Code of Nomenclature of Cultivated Plants.

1.3 DEFINITIONS

- A. Acceptance, Acceptable, or Accepted: Acceptance by the Landscape Architect in writing.
- B. Excessive Compaction of Soil or Soil Mix: Compaction greater than 75 percent dry density, as determined by ASTM D 1557.
- C. IPM — Integrated Pest Management: An approach to pest control that utilizes regular monitoring to determine if and when treatments are needed and employs physical, mechanical, cultural, biological and educational tactics to keep pest numbers low enough to

prevent intolerable damage or annoyance. Least-toxic chemical controls are used as a last resort.

- D. Horticultural Consultant: Horticultural expert employed by the Landscape Architect for this project.
- E. Agronomist: Agronomist employed by Landscape Architect for this project.
- F. Pesticide: A pesticide is any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any pest. Pests can be insects, mice and other animals, unwanted plants (weeds), fungi, or microorganisms like bacteria and viruses. Though often misunderstood to refer only to insecticides, the term pesticide also applies to herbicides, fungicides, and various other substances used to control pests. Under United States law, a pesticide is also any substance or mixture of substances intended for use as a plant regulator, defoliant, or desiccant.

1.4 SUBMITTALS

- A. General Requirements: Refer to Section 01300.
- B. Product Purchase and Delivery Documentation: Fertilizer: Within 5 working days of each application submit purchase orders, invoices and receipts showing supplier name and address, person who sold product, date of purchase, specific product purchased, quantity purchased, and delivery date.
- C. Samples: Sod grass clippings for soil fertility and plant tissue testing after sod installation — sent directly to Owner's Testing Laboratory at three-week intervals.
- D. Maintenance Log:
 - 1. Maintain a daily record of work performed until Owner acceptance of maintenance.
 - 2. Include precipitation records from on-site rain gauge; time and duration of each water application; pesticide and fertilizer applications; irrigation problems; drainage problems; soil temperatures; visual observations of plants, including lawn sod; mowing activity; tests performed; and moisture sensor readings.
 - 3. Make log available for review at any time by the Owner, the Horticultural Consultant, the Agronomist, and the Landscape Architect.
 - 4. At end of maintenance period, submit to the Owner a complete and chronologically organized maintenance log as a digital file, saved in Microsoft Office® format, and one printed copy.
- E. Documentation of Accepted Conditions: Within 7 working days after the Owner's acceptance of maintenance, submit color photographs and a written report documenting the Owner's accepted conditions of the plant material.
- F. Certificates: Certificate indicating chemical applicator is currently certified by the State of New York for commercial application, name of applicator, and State of New York license number.
- G. Plant Condition Inspection Reports: Plant inspection report documenting damage and signs of stress, pests, and disease submitted via e-mail to the Owner, the Landscape Architect, the Agronomist, and the Horticultural Consultant within 2 days of observation.

- H. Test Reports:
 - 1. Soil test reports for soil samples taken from ground cover areas.
 - 2. Laboratory soil and tissue test reports for soil and grass clipping samples taken from lawn areas.

1.5 QUALITY ASSURANCE

- A. Maintenance Contractor Qualifications:
 - 1. Demonstrated experience in maintenance of commercial landscape projects.
 - 2. Demonstrated experience in landscape maintenance supervision, with experience and training in integrated pest management, meadow-grass management, entomology, pest control, soils, fertilizers and plant identification.
 - 3. Thoroughly familiar and trained in the work to be accomplished and perform the task in a competent, efficient manner acceptable to the Owner.
 - 4. Directly employs and supervises the work force at all times.
 - 5. Notify the Owner of changes in supervision.
 - 6. Provide proper identification for landscape maintenance firm's labor force.
- B. Pesticide Applicator Qualifications: Certified for commercial pesticide application by the State of New York.
- C. Regulatory Requirements:
 - 1. Meet requirements of applicable laws, codes, and regulations required by authorities having jurisdiction over Work.
 - 2. Provide for inspections and permits and submit records required by Federal, State, or local authorities in furnishing, transporting, and application of chemicals.

1.6 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Plant Material: Meet requirements of Sections 02921 and 02930.

1.7 SITE CONDITIONS

- A. Environmental Requirements: Do not apply chemicals during windy conditions.

1.8 SEQUENCING AND SCHEDULING

- A. Work Schedule:
 - 1. Perform maintenance during normal working hours.
 - 2. Be present at the project site at least once a week and as often as necessary to perform specified maintenance.
- B. Pesticide and Fertilizer Applications:
 - 1. Notify the Owner in advance of required pesticide and fertilizer applications.
 - 2. Obtain the Owner's approval of application schedule.

1.9 EXTRA MATERIALS

- A. Moisture Sensors:
 - 1. Upon Owner acceptance of maintenance, turn over to Owner the WET-K1 WET sensor with HH2 kit and the PRI/6d-02 with 25-pin connector used during the maintenance period to monitor soil moisture, clean, undamaged, and in good working condition

2. Replace damaged or broken moisture sensors before turning them over to Owner.
- B. Moisture Sensor Access Tubes:
1. Upon final completion, turn over to Owner 5 extra ATL1 access tubes; one PR-AK1 Installation kit; and one PR-EXK1 Extraction kit.
 2. Replace damaged or broken kit parts and clean all parts before turning them over to Owner.

PART 2 — PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS AND SUPPLIERS

- A. Fertilizer for Lawn Areas: Emerald Isle, Ltd., Ann Arbor, Mich.; (800) 628-4769; www.emeraldisleltd.com.
- B. Moisture Sensors and Related Materials and Equipment: Dynamax, Inc., Houston, Tex.; (281) 564-5100; www.dynamax.com.

2.2 MATERIALS

- A. Replacement Plant Material:
1. Match existing genus, species, cultivar and size.
 2. Meet requirements of Sections 02930 and 02921.
 3. Meet requirements of ANSI Z60.1, ICBN and ICNCP.
- B. Sod and Seed: Match existing genus, species, varieties and cultivars.
- C. Fertilizer for Lawn Areas: Emerald Isle SeaBlend 12-1-12.
- D. Fertilizer for Ground Cover: Fertilizer with a 4-1-2 ratio such as 16-4-8 granular fertilizer with 50 percent of the available Nitrogen being slow-release Nitroform and 50 percent being slow-release Nutralene, Monoammonium phosphate as a phosphorous source, 13-percent sulfur, 4-percent calcium, 0.5-percent magnesium, 5-percent Ruffin iron, and 0.5-percent zinc.
- E. Pesticides: Legal commercial quality non-staining materials with original manufacturers' containers, properly labeled with guaranteed analysis, approved for use by the EPA.
- F. Mulch: Same as original installation.
- G. Moisture Sensors and Related Items: One WET-K1 WET sensor and one PRI/6d-02 with 25-pin connector; one PR-AK1 Installation Kit; one PR-EXK1 Extraction Kit; and 80 ATL1 Access Tubes.

2.3 MIXES

- A. Top Dressing Soil Mix for Filling Core Holes: Stabilized lawn soil mix specified in Section 02910.

PART 3 — EXECUTION

3.1 PREPARATION

- A. Protection of Existing Conditions:
 - 1. Use every possible precaution to prevent damage to existing conditions to remain such as structures, utilities, plant materials and walks on or adjacent to the site of the Work.
 - 2. Provide barricades, fences or other barriers to protect existing conditions from damage during maintenance operations.
 - 3. Do not store materials or equipment, permit burning, or operate or park equipment under the branches of existing plants.
 - 4. Submit written notification of damaged plants and structures to the Owner immediately.

- B. Access Tubes for Moisture Sensors:
 - 1. Install per manufacturer's current printed instructions using installation kit.
 - 2. Install 75 access tubes in ground at locations determined by Landscape Architect.

3.2 GENERAL MAINTENANCE

- A. Maintenance Period:
 - 1. Continuously maintain plant material from time of plant purchase, during progress of work, and for a minimum period of 1 year after Final Completion until the Owner accepts maintenance responsibility of plant material.
 - 2. Continuously maintain irrigation system during progress of work, and for a minimum period of 1 year after Final Completion until the Owner accepts maintenance responsibility of the plant material.

- B. Integrated Pest Management: Employ principles of integrated pest management for each aspect of maintenance.

3.3 GROUND COVER

- A. Watering:
 - 1. Using a soil sampling tube or soil auger to physically inspect soil moisture and readings from moisture sensors, check for moisture penetration throughout the root zone at least twice a week.
 - 2. Water as frequently as necessary to maintain healthy growth of plants.
 - 3. Adjust frequency and length of time for watering cycles according to changing soil and weather conditions.

- B. Weed Control:
 - 1. Maintain mulch layer.
 - 2. Minimize hoeing of weeds to avoid plant damage.
 - 3. As a last resort use least toxic herbicides required.

- C. Preliminary Fertilization Program to Establish a Bid Price:
 - 1. Fertilize ground cover 3 times per year in February, May, and July.
 - 2. Uniformly apply 2-1/2 pounds of actual Nitrogen per 1,000 square feet.
 - 3. Irrigate plants on the same day of application for 20 to 30 minutes at spray heads and 45 to 60 minutes at rotary heads.

4. Water in short cycles so that run-off does not occur.

D. Final Fertilization Program: Apply fertilizer as directed in writing by the Landscape Architect after Horticultural Consultant determines the fertilization requirements based on soil test data.

3.4 LAWN

A. Watering:

1. Using a soil sampling tube or soil auger to physically inspect soil moisture and readings from moisture sensor, check for moisture penetration throughout the root zone at least twice a week.
2. Water lawns at such frequency as weather conditions require, to replenish soil moisture to 6 inches below root zone.
3. Water at night.
4. Use multiple short watering cycles as a measure to avoid overwatering trees.
5. Hand-water lawn areas if required to avoid overwatering trees.
6. Syringe water to promote evaporative cooling during hot dry weather to reduce plant stress.

B. Weed Control:

1. As a last resort, control broadleaf weeds with least toxic herbicides.
2. Coordinate application of herbicides with thatch control and reseeding schedule.
3. Do not use pre-emergent weed control until following spring, after sod installation.

C. Mowing:

1. Maintain grass height between 1.25 and 2.50 inches.
2. Use only, rotary or reel-type mowers with clean, sharp blades.
3. Do not remove more than 1/3 of grass leaf by the initial cutting or subsequent cuttings in a 48-hour period.
4. Vary mowing pattern with each cut.
5. Remove and dispose of grass clippings.

D. Edging:

1. Trim edges at least twice a month or as needed for neat appearance.
2. Remove and dispose of grass clippings.

E. Preliminary Fertilization Program to Establish Bid: Apply 12-1-12 at rate of 1.0 pound per 1,000 square feet per month, during optimum growing conditions, for up to 6 months, and apply 12-1-12 at the rate of 0.25 pound per 1,000 square feet per month, for the remainder of the year.

F. Final Fertilization Program:

1. As determined by the Agronomist based on tissue and soil test data.
2. Work with the Agronomist to achieve the following constituent target values:

<i>Constituent</i>	<i>Unit</i>	<i>Target Values for Tissue</i>
Nitrogen:	%	5.00 – 5.50
Phosphorus:	%	0.40 – 0.60

<i>Constituent</i>	<i>Unit</i>	<i>Target Values for Tissue</i>
Potassium:	%	2.50 – 3.50
Calcium:	%	0.45 – 0.60
Magnesium:	%	0.25 – 0.35
Sulfur:	%	0.25 – 0.40
Zinc:	PPM	45.00 – 65.00
Copper:	PPM	10.00 – 20.00
Iron:	PPM	200.00 – 400.00
Manganese:	PPM	80.00 – 150.00
Boron:	PPM	10.00 – 15.00
Sodium:	%	0.01 – 0.04
Dry Matter:	%	92.00 – 98.00

G. Fertilizer Application:

1. Apply fertilizer as directed by the Landscape Architect after the Agronomist determines fertilization requirements based on the soil and tissue test data.
2. Meet requirements of fertilizer manufacturer's current printed instructions.
3. Apply fertilizers evenly over planting areas by spreading half the fertilizer in one direction and half in a direction 90 degrees to the first direction to assure even application.
4. Apply dry fertilizers with a gravity spreader.
5. Apply liquid fertilizer with a metered sprayer.
6. Water planting areas thoroughly after fertilizer application.

H. Resodding of Lawn Areas: Resod, without cost to the Owner, and as soon as weather conditions permit, lawn areas not in a vigorous, thriving condition.

I. Aeration:

1. Core lawn areas up to twice annually when directed by the Landscape Architect in writing.
2. Use machine with 3/8-inch diameter by 4-inch maximum-length cores at spacing no closer than 4 inches on center.
3. Do not core lawn areas over top of tree root balls.
4. After aeration, fill holes with stabilized lawn soil mix.
5. Remove core plugs from lawn surface.

J. Dethatching and Overseeding:

1. Verticut lawn areas to remove excessive thatch to a maximum 1/4-inch below soil surface when directed by Landscape Architect in October after ambient temperatures are below 80 degrees Fahrenheit during the day and are not less than 50 degrees Fahrenheit at night.
2. After verticutting overseed with lawn seed mix at the rate of 4 to 5 pounds per 1,000 square feet.

3.5 WOOD CHIP MULCH AREAS

- A. Surface Smoothness: Smooth out surfaces of mulch twice monthly.
- B. Weed Control:
 - 1. Maintain areas weed-free.
 - 2. As a last resort, control weeds with least toxic chemicals.

3.6 INSECTS, PESTS, AND DISEASE CONTROL

- A. General:
 - 1. Employ principles of IPM in the selection of preventative and control measures for plant pests and diseases.
 - 2. Insignificant pests will be tolerated providing they do not seriously threaten plant health and appearance unless directed otherwise by the Landscape Architect.
 - 3. Monitor the site closely and take timely action to address problems identified.
 - 4. When necessary apply the least toxic pesticide required for the existing problem, unless directed otherwise by the Landscape Architect.
 - 5. Apply pesticides only if a pest or disease is a serious threat and cease application after problem is under control, unless directed otherwise by the Landscape Architect.
 - 6. Spray pesticides with extreme care to avoid hazards to any person, pet, or automobile in the area or adjacent areas.
 - 7. Meet requirements of pesticide manufacturer's current printed label and application instructions.
 - 8. The Contractor shall be held liable for plant damage due to the use of pesticides.
- B. Plant Condition Inspection:
 - 1. Inspect plant material weekly for damage and signs of stress, pests, and disease.
 - 2. Submit a written and photographic inspection report of observed damage, and signs of stress, pests, or disease via e-mail to the Owner, the Landscape Architect, Horticultural Consultant, and the Agronomist within 2 days of observations.
 - 3. Use a digital camera with at least 5.1 megapixels of resolution to document observations.
- C. Treating Ground Cover with Insecticides:
 - 1. Spray for scale when present with Merit, Orthene, horticultural oil, or a combination of Orthene and horticultural oil following the temperature restrictions for use of oil.
 - 2. Spray for aphids with Merit, Mavrik, Tempo, or Orthene when present.
- D. Preventative Treatment for Insects and Mites on Ground Cover: Spray ground cover once during winter months with an application of dormant oil, making sure to thoroughly cover branches and leaves, including the underside of leaves.
- E. Treating Ground Cover with Fungicides:
 - 1. Spray for leaf spot when present between May and September with Heritage, Banner, Zybam, Daconil 2787, Fore, Durosan, Clearys 3336, or Dithane M-45.
 - 2. Spray for powdery mildew when present between May and September with Heritage, Banner, Daconil 2787, Funginex, Bayleton, or Rubigon.
- F. Pesticide Application Schedule to Establish Bid Price: See Preliminary Pesticide Application Schedule under Article 3.9 in this Section.

- G. Final Pesticide Application Schedule: As directed by the Landscape Architect in writing after being determined by the Horticultural Consultant.

3.7 IRRIGATION SYSTEM

- A. Damages:
 - 1. Repair without additional cost to the Owner damages to system caused by Contractor's operations.
 - 2. Perform repairs within one watering period.
- B. Cleaning and Monitoring the System:
 - 1. Continually monitor the irrigation systems to verify that they are functioning properly as designed.
 - 2. Clean filters and strainers at least once a month and as often as necessary to keep the irrigation systems free of sand and other debris.
 - 3. Set and continuously adjust and program automatic controller for seasonal water requirement.
 - 4. Make program adjustments as required by changing field conditions.
 - 5. At least once a week, daily when required, use a soil sampling tube and moisture sensors to check the root-ball moisture of representative plants as well as the surrounding soil.
 - 6. Prevent or minimize spraying on paving, windows, building walls, and other structures, by balancing the throttle control on the remote control valves and the adjustment screws on the sprinkler heads.
 - 7. Do not allow water to atomize and drift.
- C. Winterization: Prior to first freeze, drain irrigation system in the fall of the first year after installation and restart system in the following spring.

3.8 FIELD QUALITY CONTROL

- A. Owner's Testing Laboratory for Lawn Soil and Grass Clipping Tissue Testing: Tournament Turf Laboratories, Inc., Valencia, Penn.; (724) 898-2329.
- B. Soil and Plant Tissue Testing after Sod Installation to Determine Fertilization Requirements of Lawn:
 - 1. At two- to four-week intervals after sod installation three days after last fertilizer application, take from the sod areas a representative 1-gallon composite soil sample and a representative 2-cup minimum-size grass-clipping sample that is free of soil, leaves, and other contaminants.
 - 2. Submit samples to Owner's Testing Laboratory within 18 hours of taking grass-clipping sample.
 - 3. Prior to taking samples, contact Owner's Testing Laboratory to obtain and review specific sampling requirements.
 - 4. Adjust fertilization program as directed by the Landscape Architect.
- C. Soil Testing to Determine Fertilization Requirements of Ground Cover:
 - 1. Take up to 4 composite soil samples 4 times per year from the planting areas to enable the Horticultural Consultant to determine fertilization requirements.
 - 2. Take samples from locations designated by the Horticultural Consultant in the field.
 - 3. Take samples when directed by the Landscape Architect in writing.
 - 4. Send the samples to _____.

5. Employ laboratory to test for the following: percentage organic matter; phosphorous ppm; potassium ppm; magnesium ppm; calcium ppm; sodium ppm; nitrate ppm; sulfur ppm; zinc ppm; manganese ppm; iron ppm; copper ppm; boron ppm; soil pH; pH buffer index; cation exchange capacity; excess lime rate; soluble salts; and percent base saturation of K, Mg, Ca, H, and Na.
 6. Submit soil test reports via e-mail to the Owner, the Landscape Architect, the Horticultural Consultant, and the Agronomist.
- D. Periodic Maintenance Reviews by Landscape Architect:
1. The Landscape Architect, Horticultural Consultant, and the Agronomist will conduct periodic reviews of maintenance Work to monitor maintenance Work and health of plant material.
 2. Perform pesticide and fertilizer applications as directed by Landscape Architect in writing.
- E. Final Maintenance Review by the Landscape Architect, Horticultural Consultant, and Agronomist:
1. At the end of the one-year maintenance period, request the Landscape Architect to review Work.
 2. Submit a written request at least five working days prior to the anticipated date of review.
 3. If the Landscape Architect or the Horticultural Consultant observes Work that fails to meet the Contract Document requirements the Contractor will receive written notification from the Landscape Architect of corrective Work preventing Owner acceptance of the maintenance Work.
 4. Perform corrective Work within 10 calendar days after the review.
 5. Upon completion of the corrective Work, request the Landscape Architect to review the Work.
 6. Corrective Work followed by Landscape Architect's review will be required until the Landscape Architect and the Horticultural Consultant no longer observe Work not meeting the Contract Document requirements.
- F. Owner's Acceptance of Maintenance:
1. When it appears to the Landscape Architect and the Horticultural Consultant that the maintenance Work conforms to the requirements of the Contract Documents the Contractor will receive written notification from the Landscape Architect designating the day which the Owner will accept maintenance responsibility.
 2. Continue maintenance of landscape Work until the date that the Owner accepts maintenance.
- G. Final Lawn Acceptance: Lawn will be accepted at the end of the maintenance period when grass has rooted into soil mix to minimum depth of 3 inches; when lawn is free of bare spots in excess of 3 square inches; and when results of soil and plant tissue fertility tests indicate that constituents are within target values.

3.9 SCHEDULES

- A. Preliminary Pesticide Application Schedule to Establish a Bid Price:

<i>Pesticide Type</i>	<i>Applications per Year per Plant after Installation</i>

WTC – Memorial
New York, New York
DBB No. 20422
PWP No. DBB501

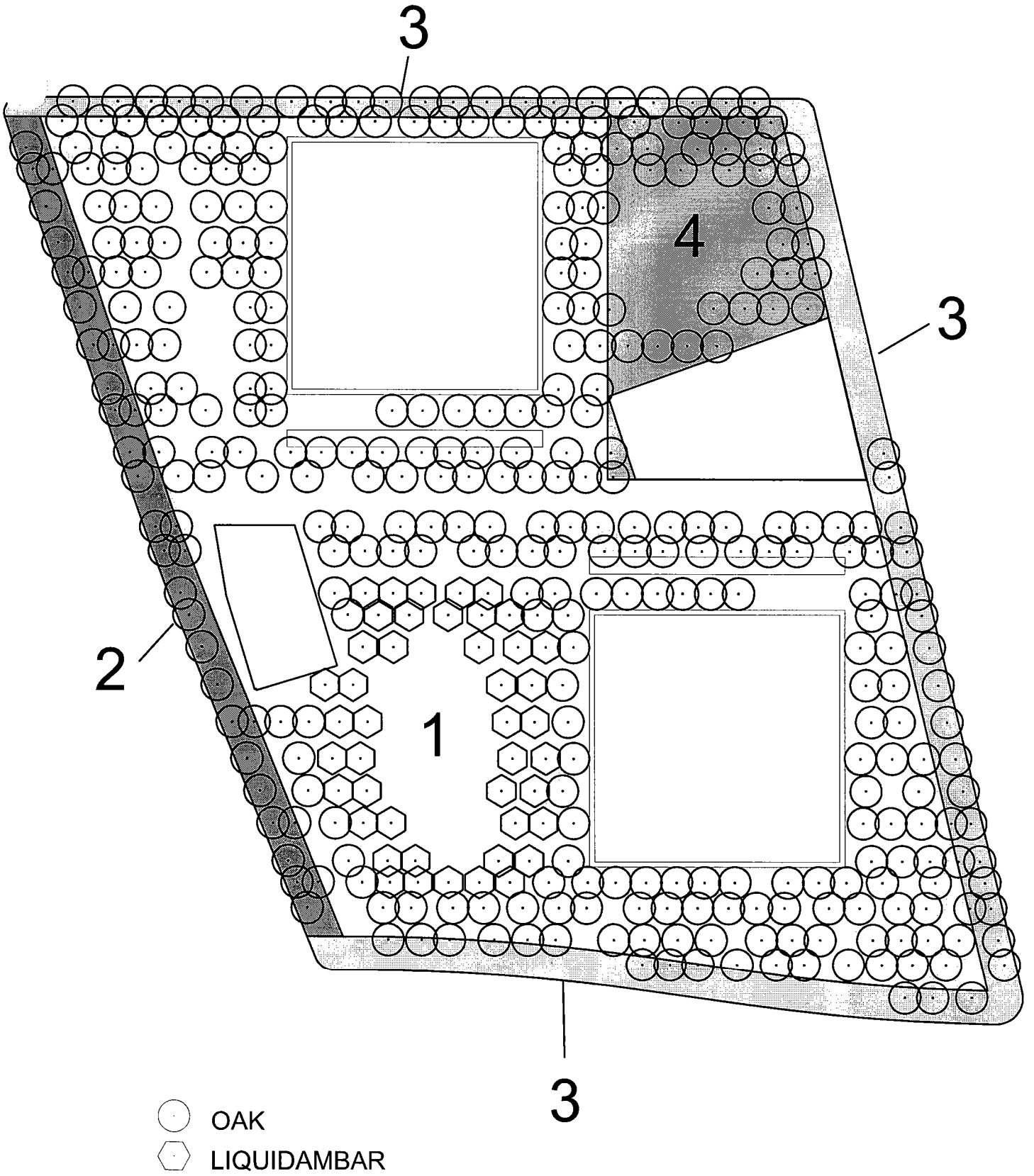
Landscape Maintenance Period
02935 - 11
50% Construction Documents
10 February, 2006

<i>Pesticide Type</i>	<i>Applications per Year per Plant after Installation</i>
Insecticide spraying:	8
Fungicide spraying:	8
Dormant oil:	1

END OF SECTION

G:\DBB\501\Specs\50% CD\02935 Landscape Maintenance Period.rtf

6



WORLD TRADE CENTER MEMORIAL
 TREE PLANTING ZONE PLAN

DAVIS BRODY BOND PETER WALKER AND PARTNERS

INDEX, NOTES AND LEGEND LANDSCAPE DRAWINGS

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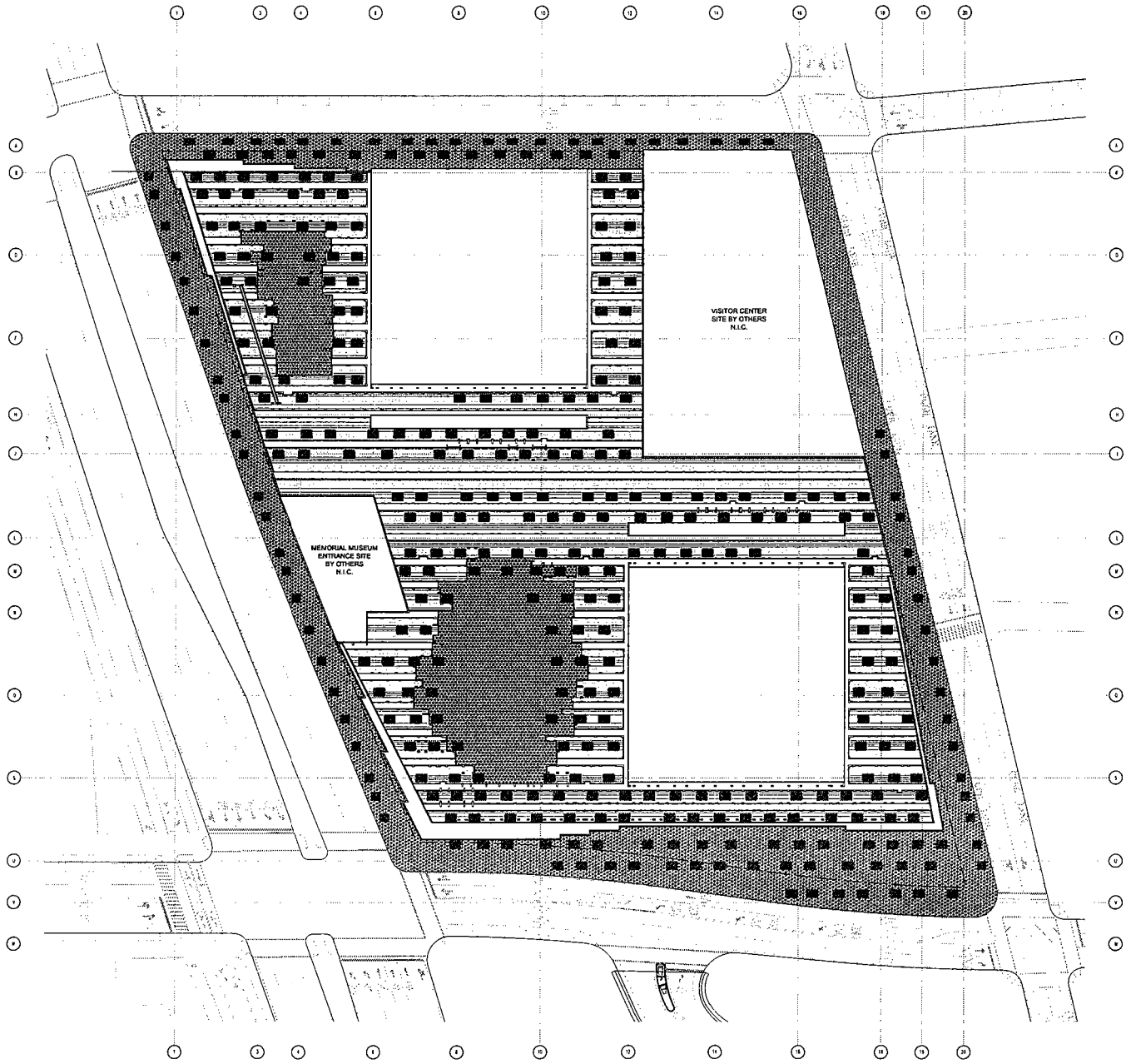
INDEX, NOTES, AND LEGEND OF LANDSCAPE DRAWINGS

SCALE

DATE: 04/10

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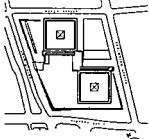
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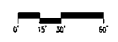
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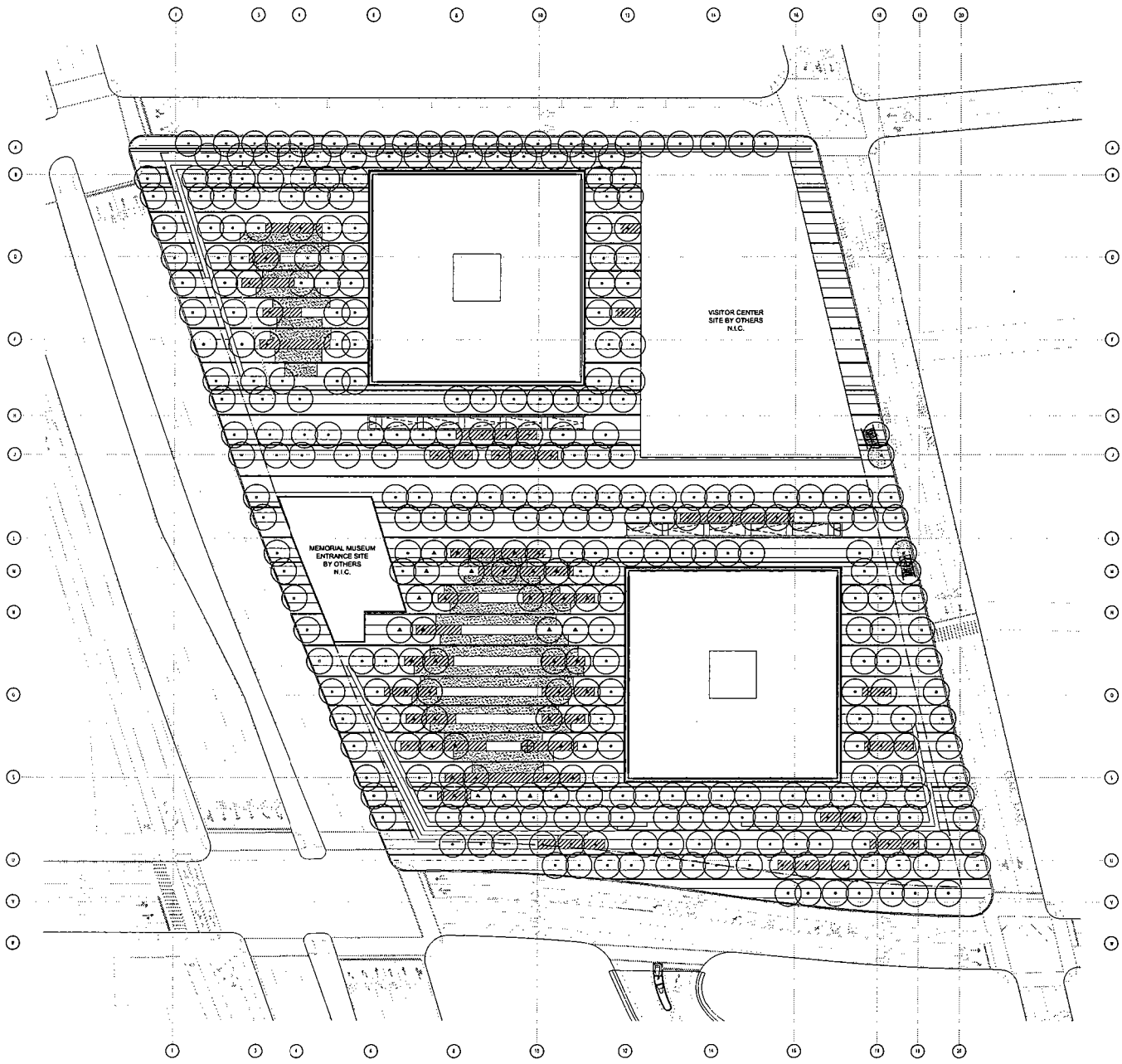


LOCATION PLAN

LANDSCAPE SOILS PLAN

SCALE: 1" = 30'
JOB NO.: 03031
DRAWN BY: JWP
CHECK DATE: 04/08/04





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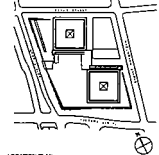
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LOCATION PLAN

PLANTING PLAN

SCALE: 1"=30'-0"
JOB NO.: 08081
DRAWN BY: JWP
CHECK DATE: 04/14/11

SCALE

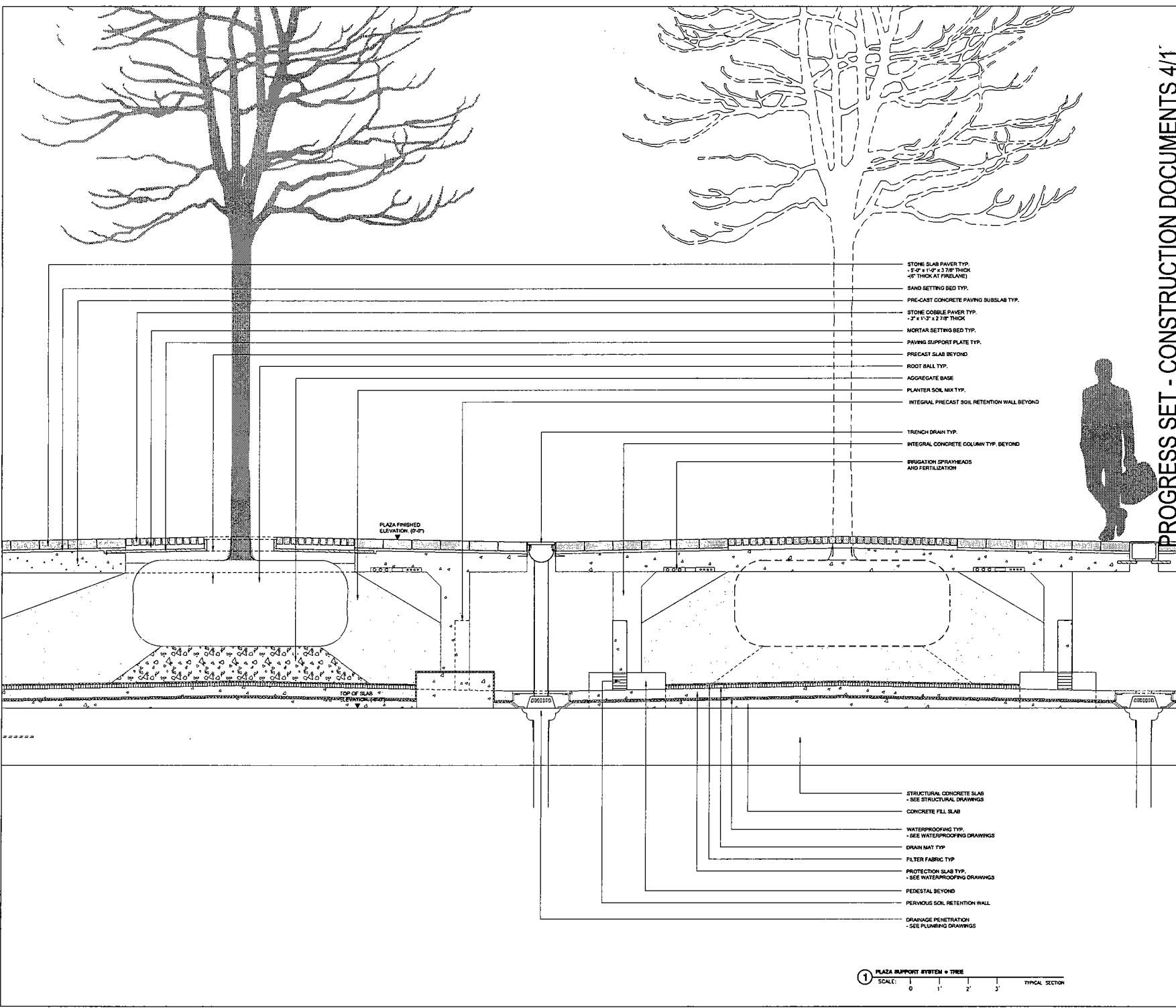
NO. DATE REVISION

LOCATION PLAN
PLAZA SUPPORT DETAIL SECTIONS

SCALE: 1/4" = 1'-0"
JOB NO.: LMS-01
DRAWN BY: [Signature]
DATE: [Date]

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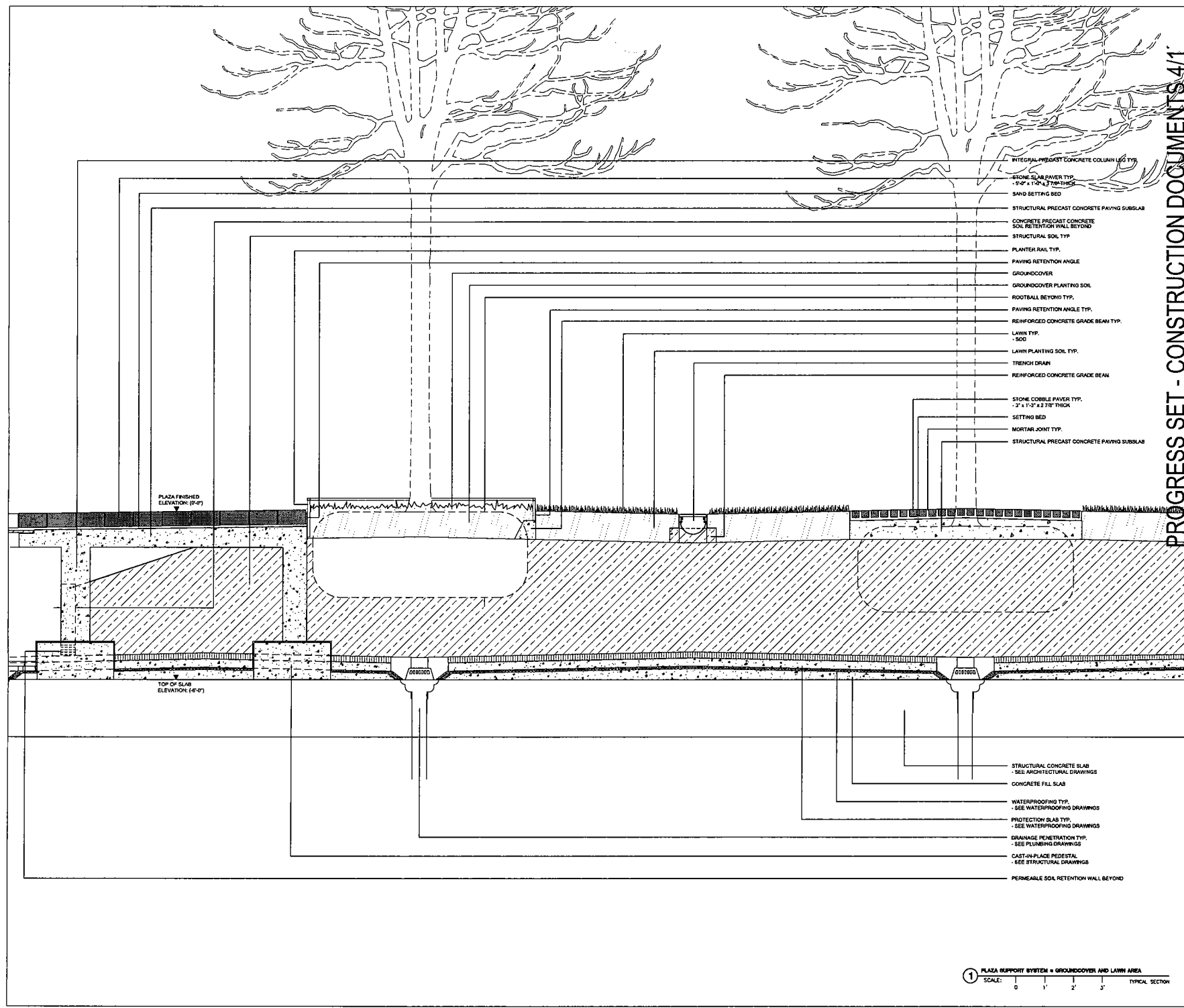
- STONE SLAB PAVER TYP.
5'-0" x 15" x 3/8" THICK
(4" THICK AT PERIMETER)
- SAND SETTING BED TYP.
- PRE-CAST CONCRETE PAVING SUBSLAB TYP.
- STONE COBBLE PAVER TYP.
2" x 1-3/4" x 2 7/8" THICK
- MORTAR SETTING BED TYP.
- PAVING SUPPORT PLATE TYP.
- PRECAST SLAB BEYOND
- ROOT RAIL TYP.
- AGGREGATE BASE
- PLANTER SOIL MIX TYP.
- INTEGRAL PRECAST SOIL RETENTION WALL BEYOND
- TRENCH DRAIN TYP.
- INTEGRAL CONCRETE COLUMN TYP. BEYOND
- IRRIGATION SPRAYHEADS AND FERTILIZATION

- STRUCTURAL CONCRETE SLAB
- SEE STRUCTURAL DRAWINGS
- CONCRETE FILL SLAB
- WATERPROOFING TYP.
- SEE WATERPROOFING DRAWINGS
- DRAIN MAT TYP.
- FILTER FABRIC TYP.
- PROTECTION SLAB TYP.
- SEE WATERPROOFING DRAWINGS
- PEDESTAL BEYOND
- PERVIOUS SOIL RETENTION WALL
- DRAINAGE PENETRATION
- SEE PLUMBING DRAWINGS

1 PLAZA SUPPORT SYSTEM - TREE
SCALE: 0 1' 2' 3' TYPICAL SECTION

NO. DATE REVISION
NO. DATE REVISION
NO. DATE REVISION

PROGRESS SET - CONSTRUCTION DOCUMENTS 4/1

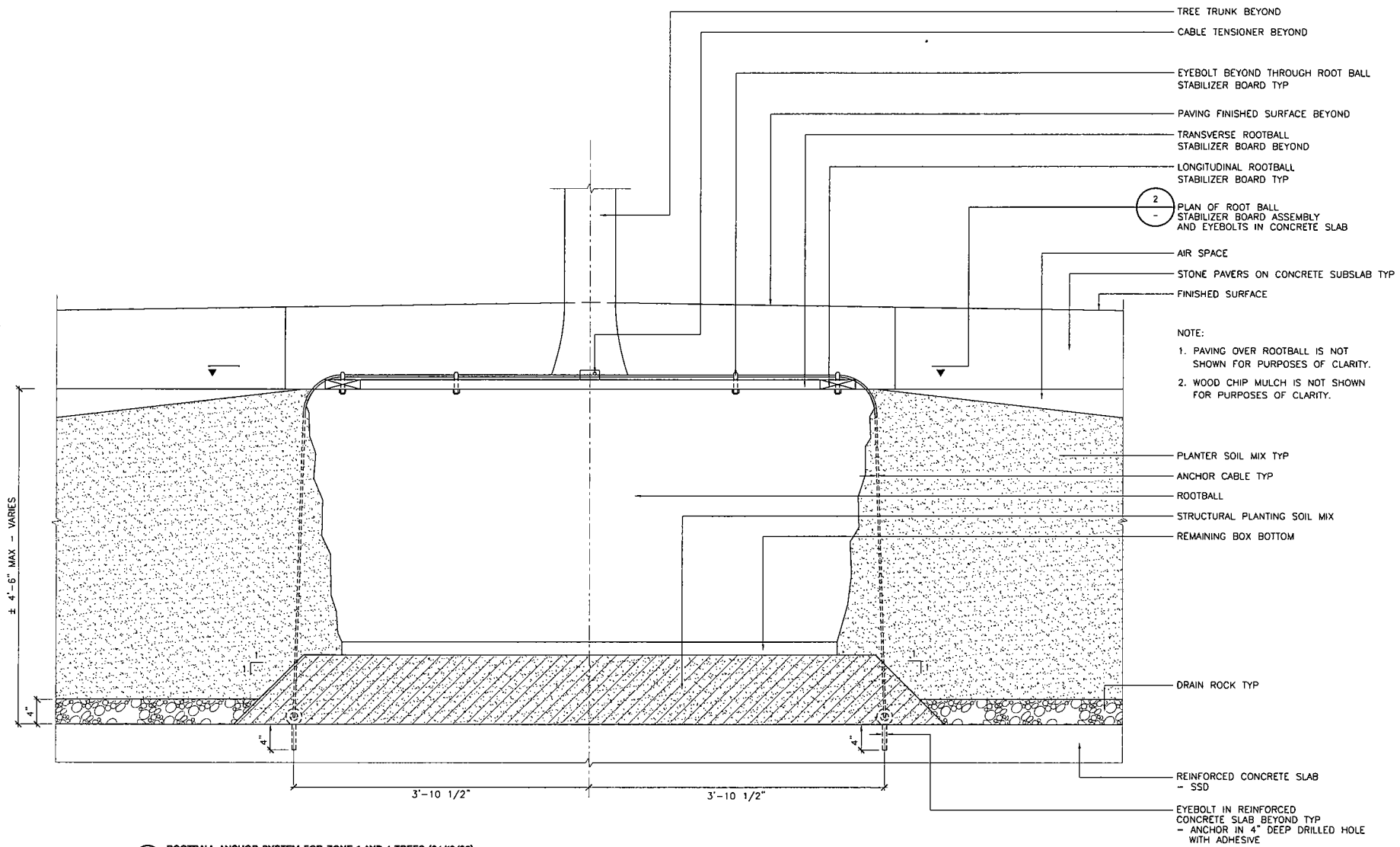


- INTEGRAL PRECAST CONCRETE COLUMN LEG TYP.
- STONE SLAB PAVER TYP.
- 5'-0" x 1'-0" x 2 1/2" THICK
- SAND SETTING BED
- STRUCTURAL PRECAST CONCRETE PAVING SUBSLAB
- CONCRETE PRECAST CONCRETE SOIL RETENTION WALL BEYOND
- STRUCTURAL SOIL TYP.
- PLANTER RAIL TYP.
- PAVING RETENTION ANGLE
- GROUNDCOVER
- GROUNDCOVER PLANTING SOIL
- ROOTBALL BEYOND TYP.
- PAVING RETENTION ANGLE TYP.
- REINFORCED CONCRETE GRADE BEAM TYP.
- LAWN TYP.
- LAWN PLANTING SOIL TYP.
- TRENCH DRAIN
- REINFORCED CONCRETE GRADE BEAM
- STONE COBBLE PAVER TYP.
- 2 1/4" x 1 1/2" x 2 1/2" THICK
- SETTING BED
- MORTAR JOINT TYP.
- STRUCTURAL PRECAST CONCRETE PAVING SUBSLAB

- STRUCTURAL CONCRETE SLAB
- SEE ARCHITECTURAL DRAWINGS
- CONCRETE FILL SLAB
- WATERPROOFING TYP.
- SEE WATERPROOFING DRAWINGS
- PROTECTION SLAB TYP.
- SEE WATERPROOFING DRAWINGS
- DRAINAGE PENETRATION TYP.
- SEE PLUMBING DRAWINGS
- CAST-IN-PLACE PEDESTAL
- SEE STRUCTURAL DRAWINGS
- PERMEABLE SOIL RETENTION WALL BEYOND

1 PLAZA SUPPORT SYSTEM - GROUNDCOVER AND LAWN AREA
SCALE: 0 1' 2' 3' TYPICAL SECTION

NO. DATE REVISION



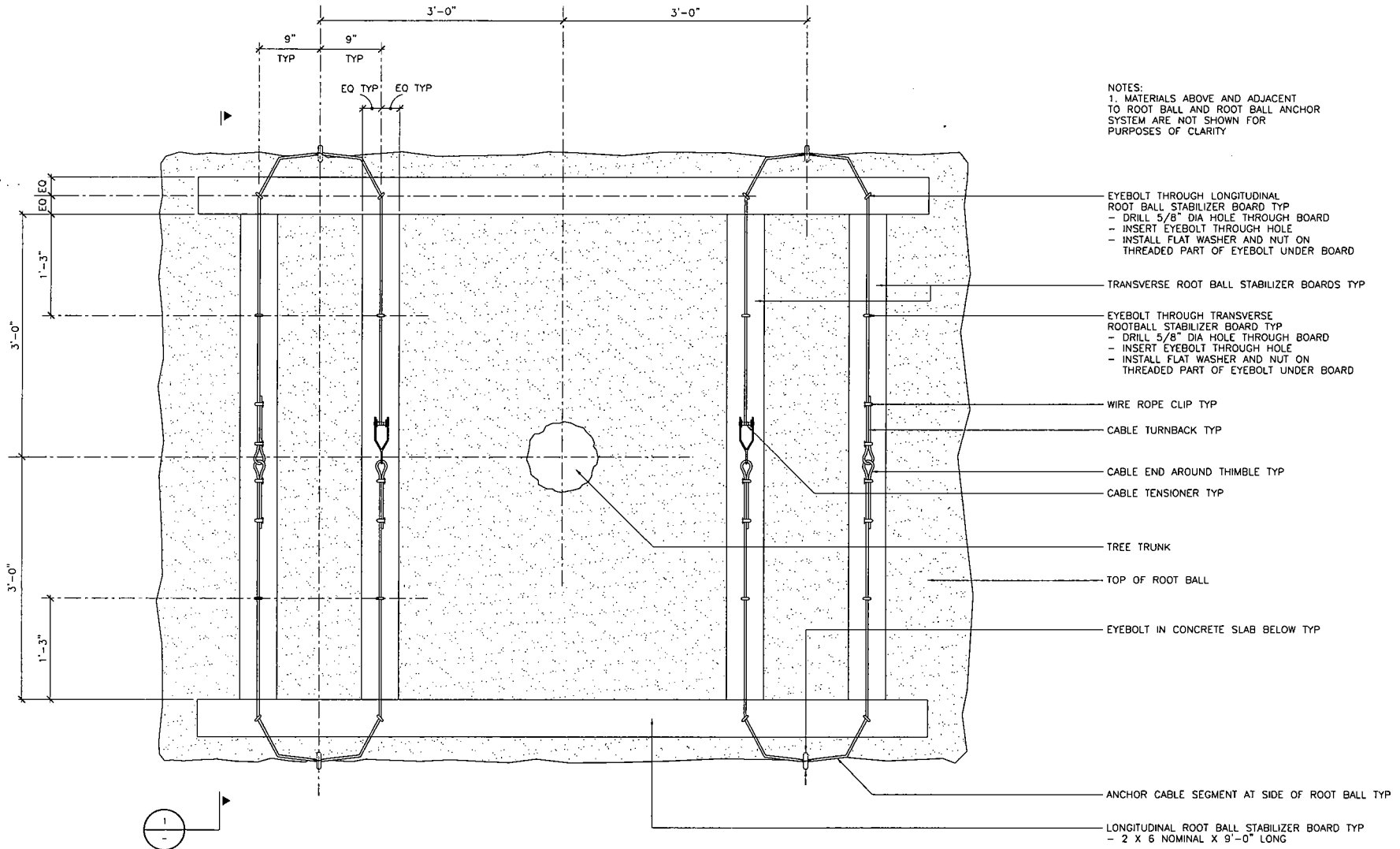
- TREE TRUNK BEYOND
- CABLE TENSIONER BEYOND
- EYEBOLT BEYOND THROUGH ROOT BALL STABILIZER BOARD TYP
- PAVING FINISHED SURFACE BEYOND
- TRANSVERSE ROOTBALL STABILIZER BOARD BEYOND
- LONGITUDINAL ROOTBALL STABILIZER BOARD TYP
- 2
-
PLAN OF ROOT BALL STABILIZER BOARD ASSEMBLY AND EYEBOLTS IN CONCRETE SLAB
- AIR SPACE
- STONE PAVERS ON CONCRETE SUBSLAB TYP
- FINISHED SURFACE

NOTE:
 1. PAVING OVER ROOTBALL IS NOT SHOWN FOR PURPOSES OF CLARITY.
 2. WOOD CHIP MULCH IS NOT SHOWN FOR PURPOSES OF CLARITY.

- PLANTER SOIL MIX TYP
- ANCHOR CABLE TYP
- ROOTBALL
- STRUCTURAL PLANTING SOIL MIX
- REMAINING BOX BOTTOM
- DRAIN ROCK TYP
- REINFORCED CONCRETE SLAB - SSD
- EYEBOLT IN REINFORCED CONCRETE SLAB BEYOND TYP - ANCHOR IN 4" DEEP DRILLED HOLE WITH ADHESIVE

± 4'-6" MAX - VARIES

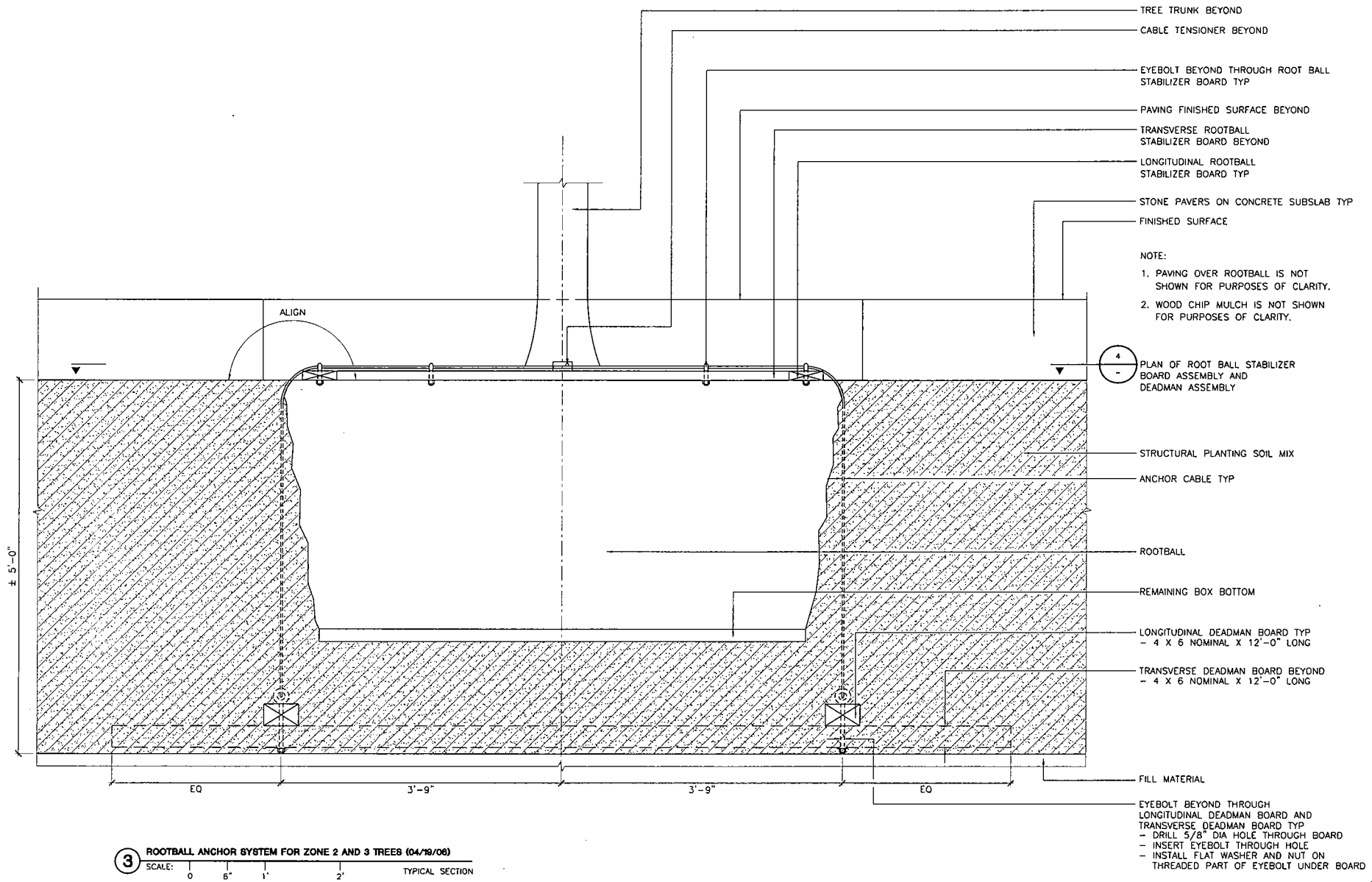
1 ROOTBALL ANCHOR SYSTEM FOR ZONE 1 AND 4 TREES (04/19/06)
 SCALE: 0 6" 1' 2' TYPICAL SECTION



NOTES:
 1. MATERIALS ABOVE AND ADJACENT TO ROOT BALL AND ROOT BALL ANCHOR SYSTEM ARE NOT SHOWN FOR PURPOSES OF CLARITY

- EYEBOLT THROUGH LONGITUDINAL ROOT BALL STABILIZER BOARD TYP
 — DRILL 5/8" DIA HOLE THROUGH BOARD
 — INSERT EYEBOLT THROUGH HOLE
 — INSTALL FLAT WASHER AND NUT ON THREADED PART OF EYEBOLT UNDER BOARD
- TRANSVERSE ROOT BALL STABILIZER BOARDS TYP
- EYEBOLT THROUGH TRANSVERSE ROOTBALL STABILIZER BOARD TYP
 — DRILL 5/8" DIA HOLE THROUGH BOARD
 — INSERT EYEBOLT THROUGH HOLE
 — INSTALL FLAT WASHER AND NUT ON THREADED PART OF EYEBOLT UNDER BOARD
- WIRE ROPE CLIP TYP
- CABLE TURNBACK TYP
- CABLE END AROUND THIMBLE TYP
- CABLE TENSIONER TYP
- TREE TRUNK
- TOP OF ROOT BALL
- EYEBOLT IN CONCRETE SLAB BELOW TYP
- ANCHOR CABLE SEGMENT AT SIDE OF ROOT BALL TYP
- LONGITUDINAL ROOT BALL STABILIZER BOARD TYP
 — 2 X 6 NOMINAL X 9'-0" LONG

2 ROOTBALL ANCHOR SYSTEM FOR ZONE 1 AND 4 TREES (04/09/06)
 SCALE: 0 6" 1' 2' TYPICAL PLAN



- TREE TRUNK BEYOND
- CABLE TENSIONER BEYOND
- EYEBOLT BEYOND THROUGH ROOT BALL STABILIZER BOARD TYP
- PAVING FINISHED SURFACE BEYOND
- TRANSVERSE ROOTBALL STABILIZER BOARD BEYOND
- LONGITUDINAL ROOTBALL STABILIZER BOARD TYP
- STONE PAVERS ON CONCRETE SUBSLAB TYP
- FINISHED SURFACE

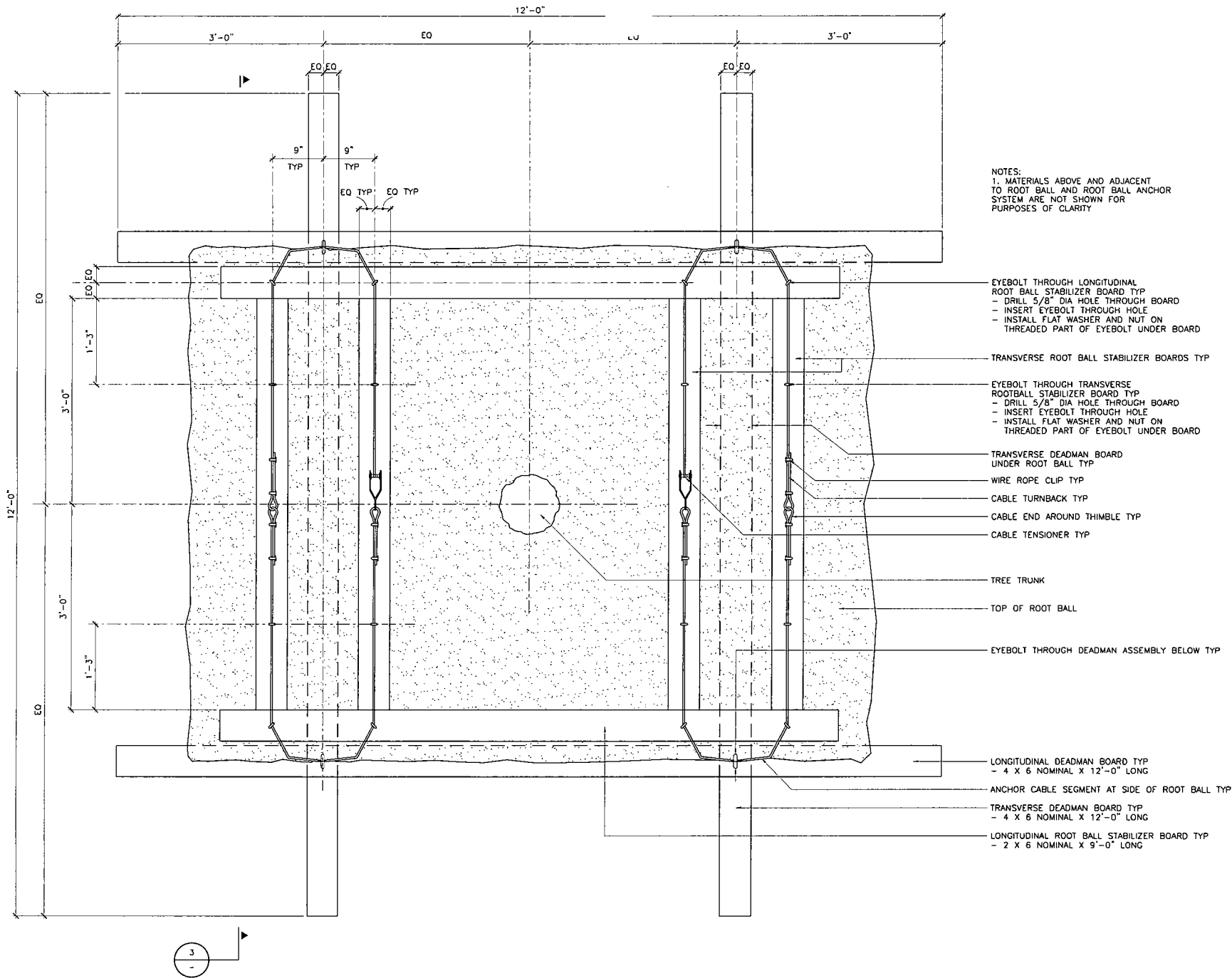
NOTE:
 1. PAVING OVER ROOTBALL IS NOT SHOWN FOR PURPOSES OF CLARITY.
 2. WOOD CHIP MULCH IS NOT SHOWN FOR PURPOSES OF CLARITY.

4
 PLAN OF ROOT BALL STABILIZER BOARD ASSEMBLY AND DEADMAN ASSEMBLY

- STRUCTURAL PLANTING SOIL MIX
- ANCHOR CABLE TYP
- ROOTBALL
- REMAINING BOX BOTTOM
- LONGITUDINAL DEADMAN BOARD TYP - 4 X 6 NOMINAL X 12'-0" LONG
- TRANSVERSE DEADMAN BOARD BEYOND - 4 X 6 NOMINAL X 12'-0" LONG

- FILL MATERIAL
- EYEBOLT BEYOND THROUGH LONGITUDINAL DEADMAN BOARD AND TRANSVERSE DEADMAN BOARD TYP - DRILL 5/8" DIA HOLE THROUGH BOARD - INSERT EYEBOLT THROUGH HOLE - INSTALL FLAT WASHER AND NUT ON THREADED PART OF EYEBOLT UNDER BOARD

3 ROOTBALL ANCHOR SYSTEM FOR ZONE 2 AND 3 TREES (04/19/06)
 SCALE: 0 6" 1' 2' TYPICAL SECTION



NOTES:
 1. MATERIALS ABOVE AND ADJACENT TO ROOT BALL AND ROOT BALL ANCHOR SYSTEM ARE NOT SHOWN FOR PURPOSES OF CLARITY

- EYEBOLT THROUGH LONGITUDINAL ROOT BALL STABILIZER BOARD TYP
 — DRILL 5/8" DIA HOLE THROUGH BOARD
 — INSERT EYEBOLT THROUGH HOLE
 — INSTALL FLAT WASHER AND NUT ON THREADED PART OF EYEBOLT UNDER BOARD
- TRANSVERSE ROOT BALL STABILIZER BOARDS TYP
- EYEBOLT THROUGH TRANSVERSE ROOTBALL STABILIZER BOARD TYP
 — DRILL 5/8" DIA HOLE THROUGH BOARD
 — INSERT EYEBOLT THROUGH HOLE
 — INSTALL FLAT WASHER AND NUT ON THREADED PART OF EYEBOLT UNDER BOARD
- TRANSVERSE DEADMAN BOARD UNDER ROOT BALL TYP
- WIRE ROPE CLIP TYP
- CABLE TURNBACK TYP
- CABLE END AROUND THIMBLE TYP
- CABLE TENSIONER TYP
- TREE TRUNK
- TOP OF ROOT BALL
- EYEBOLT THROUGH DEADMAN ASSEMBLY BELOW TYP
- LONGITUDINAL DEADMAN BOARD TYP
 — 4 X 6 NOMINAL X 12'-0" LONG
- ANCHOR CABLE SEGMENT AT SIDE OF ROOT BALL TYP
- TRANSVERSE DEADMAN BOARD TYP
 — 4 X 6 NOMINAL X 12'-0" LONG
- LONGITUDINAL ROOT BALL STABILIZER BOARD TYP
 — 2 X 6 NOMINAL X 9'-0" LONG

4 ROOTBALL ANCHOR SYSTEM FOR ZONE 2 AND 3 TREES (04/09/06)
 SCALE: 0 6" 1' 2' TYPICAL PLAN