

ADDITIONAL SERVICES AMENDMENT

In connection with the Development Services Agreement between Water Street Development Corporation LDC (“Owner”) and United-Pike Development JV, LLC (“Developer”) dated November 1, 2021 for the development of a new municipal parking garage and mixed-use project in place of the existing Water Street Parking Garage in Binghamton, New York (the “Development Agreement”), the services outlined below are additional services and reimbursable costs over and above the scope of services otherwise to be provided by Developer pursuant to the Development Agreement.

AMENDMENT #1

February 28, 2022

GEOTECHNICAL ENGINEERING SERVICES

Whereas, the Development Agreement Section 4.1 (iii) provides that the City will directly bid and pay the cost for a geotechnical investigation, such provision is hereby modified whereby Developer shall instead hire the geotechnical engineer to conduct a geotechnical investigation into existing foundation, soil and related issues to assist in design of the Parking Garage and calculation of the Parking GMP and, therefore, Developer is hereby authorized to proceed as follows:

Developer shall execute the attached proposal from McLaren Engineering Group (“McLaren”), dated February 11, 2022, for Geotechnical Engineering Services (the “Proposal”), which is hereby approved by Owner. Developer shall direct and supervise McLaren in the performance and completion of the work pursuant to the Proposal.

A fee (the “Services Fee”) shall be paid to Developer in an amount equal to four percent (4.00%) of the aggregate actual payments made to McLaren for services provided and expenses incurred under the Proposal, plus Developer’s related reasonable reimbursable expenses. The Services Fee and expenses shall be paid by Owner as part of each billing submitted by Developer.

Developer shall submit billing requisitions to Owner, which shall include copies of invoices received from McLaren for its services and related expenses, plus the Services Fee and Developer’s reasonable reimbursable expenses, which shall be paid by Owner within thirty (30) business day of receipt by Owner.

Attachments:

- McLaren Proposal for Geotechnical Engineering Services 2/11/22
- GRL Dynamic Measurements & Analysis Proposal for Dynamic Pile Testing & Wave Equation Analysis 2/04/22
- Dynamic Load Testing with APPLE Systems brochure

SUBMITTED BY:

UNITED-PIKE DEVELOPMENT JV, LLC

By: _____
Name: Michael J. Uccellini
Title: Manager

ACCEPTED AND APPROVED:

WATER STREET DEVELOPMENT CORPORATION LDC

By: _____
Name: _____
Title: _____

February 11, 2022

United Pike Development JC, LLC
300 Jordan Road
Troy, NY 12180

Attn: Jeffrey Smetana

Email: jeff.smetana@ugoc.com

Re: Proposal for Geotechnical Engineering Services
Binghamton Water Street Project
183 Water Street
Binghamton, NY 13901

PROPOSAL NO. 210779.02 REV.01

M.G. McLaren Engineering and Land Surveying, P.C. (McLaren) is pleased to provide United Pike Development JC, LLC (Pike) this proposal for geotechnical engineering services in respect to the proposed new parking garage located at 183 Water Street in Binghamton, NY. Our objective will be to evaluate the subsurface conditions at the site and provide geotechnical engineering and design recommendations for the proposed construction. It should be noted that this proposal supersedes our previously issued proposal for geotechnical engineering services, dated

PROJECT BACKGROUND

Our project understanding is based on our correspondence with you as well as the documentation furnished to our office.

It is our understanding that CJS Architects is proposing to replace an existing parking garage and develop a mixed-use parking garage and apartment structure located in Binghamton, NY. The project will include the demolition of the existing parking garage and construction of a new 5-story parking garage with 5-stories of apartments above. The site is located between Water Street and Center Street, south of Henry Street.

The overall footprint of the project is approximately 300 feet by 130 feet with an additional 125 feet at the south extending over an existing retail department store (Boscov's Department Store). The parking garage is intended to be of reinforced concrete or precast concrete construction with cast-in-place concrete shear walls for lateral support. The existing south overbuild parking above Level 3 of the Boscov's Department Store will be demolished (by the City of Binghamton) and will not include any new construction at this time.

GEOTECHNICAL ENGINEERING

Our scope of services has been developed based on the documentation furnished to our office and in accordance with your request. Our scope will include a subsurface investigation, preparation of a boring location plan, test boring logs, and a geotechnical report and engineering design recommendations.

Based on our previous discussions with you, we are proposing to approach the subsurface investigation in two phases: the preliminary investigation phase will consist of test borings advanced in the sidewalk

around the site perimeter concurrently during the demolition of the existing structure. The final investigation phase will be performed within the proposed building footprint following completion of the demolition work.

PHASE 01 – PRELIMINARY FIELD INVESTIGATION

McLaren will solicit a minimum two (2) bids from a drilling subcontractor to perform the subsurface investigation; we have assumed that the drilling subcontractor will be retained by the client and have included an estimate of their fee in this proposal. Actual drilling subcontractor costs may vary.

McLaren will perform a preliminary subsurface investigation to accommodate the design schedule. The preliminary investigation will consist of advancing test borings around the perimeter of the existing building prior to completion of demolition to the existing structure.

Three test borings will be advanced from the sidewalk using a truck-mounted drill rig to a depth of 100 feet below ground surface, or 5 feet into competent rock.

Standard penetration tests (SPTs) will be performed during drilling and soil samples will be obtained using a split spoon sampler at about two-foot intervals to a depth of 12 feet and at approximate five-foot intervals thereafter at all boring locations. Our field engineer will log the soil borings and classify the soil samples using the modified Burmister classification system. The Unified Soil Classification System (USCS) symbol will also be provided for each stratum encountered. Rock will be described using a modified ISRM system. If rock is encountered, rock coring will be performed at each test boring location and will be advanced five (5) feet into competent bedrock.

We will install a temporary groundwater observation well with a flush-mount locking cap to a depth of approximately 30-35 feet in two of the borings to observe groundwater levels at the site. Groundwater level readings will be taken during the exploration program.

We will submit a select number of soil and rock core samples to our subcontracted geotechnical laboratory for testing. The testing program will help confirm the visual identification of the soils and strength of the underlying rock and will be used to develop engineering material properties used in our analysis. The testing program will consist of the following:

- Grain Size Sieve Analyses & Classification, ASTM D422
- Moisture Content, ASTM D422

The drilling subcontractor will be required to contact the utility mark-out system as required by law. It is necessary for you to provide us with all available information regarding subsurface utilities at the project site. Neither we nor our subcontractor will be responsible for damage to, or repair of, utilities unknown to us. If sufficient information is not available, we recommend subcontracting a private utility locating service to scan the area for the presence of utilities at the boring locations. This proposal has included scanning for private utilities at the boring locations in the estimated drilling subcontractor fee.

McLaren Engineering will assume that the drilling contractor will be responsible for obtaining all necessary permits required.

The locations of the test borings will be estimated based on tape measurements from existing building features. No surveying for location or elevation will be performed. We will rely on a topographical survey to be provided by you for estimated ground surface elevations at the exploration locations.

McLaren's scope of work for field investigations is as follows:

1. Develop Boring Plan and specifications for exploratory work to be used by Drilling Contractor.
2. Solicit a proposal from Drilling Contractors. Analyze the bid and select the most qualified subcontractor.
3. Field oversight of the subsurface investigation to obtain borings, including coordinating all activities of the Drilling Contractor (Assume a maximum of six (6) days of borings will be performed). McLaren assumes that the Client will provide access to all borings.
4. Preparation of field reports and, coordination of obtaining boring logs and all laboratory testing.

PHASE 02 – PRELIMINARY GEOTECHNICAL ENGINEERING AND REPORT

McLaren will evaluate the subsurface conditions observed at the site, review published geotechnical data from the surrounding area, perform geotechnical engineering analysis and prepare a preliminary geotechnical report. This report will be required to be followed by a final geotechnical report after the supplemental subsurface investigation has been completed to meet building code requirements for the proposed new parking garage. It should be noted that the preliminary geotechnical report recommendations will be based on a limited scope of investigation and therefore may be subject to change in the final geotechnical report.

Our preliminary report will be prepared in accordance with the New York State Building Code, and will include the following:

- a. Description of site terrain and geology, including presence of water.
- b. Description of exploration and sampling methods.
- c. A plan indicating the location of the borings and the elevations related to the nearest elevation available (based on survey information provided to us). Borings shall be numbered and located dimensionally.
- d. Develop an evaluation of the subsurface stratigraphy.
- e. Logs of exploratory borings, including:
 - Surface elevation
 - Elevation, thickness, description, and classification of each soil stratum
 - Location and type of soil samples
 - Laboratory and field results at appropriate depth
 - Location of water table
 - Location of obstructions
- f. Soil classification and identification shall be in accordance with the Unified Soil Classification System (ASTM D2487) and New York State Building Code.
- g. Presentation of the laboratory tests result and procedures, including:
 - Water content (ASTM D2216)
 - Particle size analysis of soils (ASTM D422)
 - Samples shall be retained by the McLaren and shall remain open to inspection until the foundation work is complete.
- h. McLaren will note and immediately advise the Owner of the presence of any deleterious substances present in the soil. Environmental Testing is excluded.

- i. Preliminary design recommendations and values for drilled piers or piles if proposed, including:
 - Skin friction values for uplift
 - End bearing values
 - Lateral bearing values including whether an increase for short duration of loading is permissible. Values to be expressed in terms of nominal pier/pile diameters
- j. Preliminary Information on settlements to be expected, both short and long term and any expected differential settlement.
- k. Provide preliminary site coefficient and/or other seismic design criteria as required per pertinent building code(s).
- l. Provide preliminary liquefaction potential analysis and recommendations.
- m. Suitability of site excavated material for use as fill or backfill material and general availability of suitable off-site fill if necessary.
- n. Recommendations for imported backfill material.
- o. Groundwater elevations and anticipated construction problems due to ground water.
- p. Provide recommendations regarding temporary and permanent ground water control, if applicable. Specification of substructure waterproofing, including waterproofing materials and specifications, shall be provided by others.
- q. Provisions for the control and drainage of subsurface water.
- r. Design recommendations for deep foundations have been excluded.
- s. Criteria for locating footings at different elevations relative to each other.
- t. Criteria for locating trenches and backfilling of trenches for pipes parallel and perpendicular to footings.

Our proposal does not include performing a site-specific seismic evaluation. We will evaluate the results of the subsurface investigation regarding the liquefaction potential at the site and other seismic considerations and advise if performing the evaluation would provide cost benefit to the project.

PHASE 03 – SUPPLEMENTAL FIELD INVESTIGATION

McLaren will solicit a minimum two (2) bids from a drilling subcontractor to perform the supplemental subsurface investigation; we have assumed that the drilling subcontractor will be retained by the client and have included an estimate of their fee in this proposal. Actual drilling subcontractor costs may vary.

McLaren will perform a supplemental field investigation to complete the subsurface exploration program and provide sufficient number of test borings to satisfy NYSBC requirements. The investigation will consist of advancing test borings inside the footprint of the new proposed structure, test pits at select existing pile cap locations, and performance of dynamic load testing on select existing piles to evaluate pile capacity (detailed explanation in Phase 4). We have assumed that the site will be accessible to a truck-mounted drill rig.

The final field investigation will conform to McLaren's standard field investigation as described in Phase 1 of this proposal including sampling procedures, location of test borings, soil sampling, permits, subcontractor utility mark-out and scope of work for field investigations.

Nine (9) additional test borings will be advanced from inside the proposed footprint of the new structure using a truck-mounted drill rig to a depth of 60 feet below ground surface, or 5 feet into competent rock. A maximum of 10 linear feet of rock coring will be performed.

We will submit a select number of additional soil and rock core samples to our subcontracted geotechnical laboratory for testing. The testing program will help confirm the visual identification of the soils and strength of the underlying rock and will be used to develop engineering material properties used in our analysis. The testing program will consist of the following:

- Grain Size Sieve Analyses & Classification, ASTM D422
- Moisture Content, ASTM D422

Twelve (12) test pits will be performed at existing pile caps to evaluate the fill stratum and condition of existing piles. Measurements of the size and configuration of the piles will be observed and documented by McLaren. Soil samples from the test pit will be taken to test for corrosivity of the soil and will be in accordance with ASTM G162. McLaren will assume that the demolition contractor will be responsible for the excavation of the test pits.

PHASE 04 – EXISTING PILE DYNAMIC TESTING

We understand that the piles currently supporting the existing building are intended for reuse for the proposed new structure. McLaren will coordinate and solicit a subcontractor to perform Dynamic Pile Testing on 5-10 percent (about 20-40 piles) of the existing piles at the project site; we have assumed that the PDA testing contract will be retained by the client. The pile locations designated for testing will be spaced evenly throughout the site and selected by McLaren. We anticipate that this phase of work can be performed during the supplemental field investigation following completion of demolition of the existing structure. The pile testing subcontractor will require assistance from the on-site contractor to move and set up the testing equipment at existing pile locations. It will also be required that the on-site demolition contractor remove the pile cap at the piles selected for dynamic testing. We have assumed this will be coordinated by you.

Pile Driving Analyzer (PDA) Testing will be performed on existing piles to evaluate the potential of re-using the piles to support structural loads for the new proposed building. The member size, member depth and design capacity are currently unknown and PDA testing will allow McLaren to evaluate the current load carrying capacity of the piles; based on the current existing structure we have estimated about 150-200k per pile for our ultimate test load. As stated, we will test a minimum of five percent of the existing piles, with the potential to test up to ten percent. The final number of tests will be determined on the test results observed in the initial five percent. PDA testing will be conducted in accordance with ASTM D4945.

An additional on-site representative from McLaren will be required to observe the PDA testing during the supplemental investigation phase and pricing will be included separately as a unit price. Our subcontractor will deliver the drop-hammer and other equipment required for the test to the project site, however assistance will be required from the on-site contractor for unloading the equipment and transporting it between pile locations. The PDA equipment will require site equipment capable of moving 4,000 pounds in a safe manner.

PHASE 05 – FINAL GEOTECHNICAL ENGINEERING AND REPORT

McLaren will evaluate the subsurface conditions observed during the supplemental field investigation and update our recommendations from the preliminary geotechnical report. The final geotechnical report will include the report content listed under Phase 2 and will also include the following:

Our preliminary report will be prepared in accordance with the New York State Building Code, and will include the following:

- a. Updated boring location plan and subsurface stratum descriptions to include information from the supplemental boring investigation.
- b. Description of exploration and sampling methods.
- c. Design recommendations and values for new driven piles if proposed, including:
 - Skin friction values for uplift
 - End bearing values
 - Lateral bearing values including whether an increase for short duration of loading is permissible. Values to be expressed in terms of nominal pier/pile diameters
- d. Information on settlements to be expected, both short and long term and any expected differential settlement.
- e. Provide liquefaction potential analysis and recommendations.
- f. Summary of the results of the PDA testing performed on the existing piles.
- g. Recommended allowable bearing capacity of existing piles and/or pile caps.

Our proposal does not include performing a site-specific seismic evaluation. We will evaluate the results of the subsurface investigation regarding the liquefaction potential at the site and other seismic considerations and advise if performing the evaluation would provide cost benefit to the project.

PHASE 06 – GEOTECHNICAL COORDINATION AND SUPPORT

1. Coordination with the structural engineer during the design phase.
2. Project meetings and conference calls with the Client, Architect, etc. We have included a total of two (2) meetings in the Fee.

PHASE 07 – PILE INSTALLATION OBSERVATION

1. The proposed Scope of Services will include verifying that the new piles that are to be installed conform to the contract documents prepared, signed and sealed by the New York State Professional Engineer, and to the recommendations of the approved Geotechnical Report. Our site inspections will include the following:
 2. Verify that the pile materials, sizes and lengths comply with the contract documents.
 3. Confirm type and size of hammer.
 4. Observe the driving operations and maintain records for each pile and provide copies of the driving records to the Engineer of Record.
 5. Record number of blows per foot of penetration.
 6. Record tip and butt elevations.
 7. Verify placement locations and plumbness, based on survey of as-driven piles by the Contractor.
 8. Document pile damage and report to Engineer of Record.

PHASE 08 – SIGNED AND SEALED DRIVING RECORDS

1. McLaren will provide a compiled record, review and Engineer's certification of the pile driving.

PHASE 09 – STATIC LOAD TEST OBSERVATION

Static load testing will be required for new deep foundations to confirm that the load carrying capacity of new piles is in conformance with the design recommendations. We recommend that static load testing of existing piles also be performed in addition to the dynamic testing discussed in Phase 4 of this proposal. Static load testing shall be performed in accordance with the 2020 New York State Building Code and recommendations provided in the Final Geotechnical Report; piles shall be tested to 200% of the recommended allowable design loads.

We anticipate this can be performed following the completion of the subsurface investigation; however, we understand this will need to be coordinated with the construction schedule. An on-site representative from McLaren will be required to provide full-time observation during the load testing and pricing will be included separately as a unit price. McLaren Engineering will assume that the contractor will be responsible for the requirements needed to mobilize for the static load tests.

We will observe and document the static load test and report success or failure. At this time, we anticipate that static load testing would be required on two (2) existing piles and two (2) new piles, however this may be subject to change based on the final design recommendations. Our pricing has been estimated at a unit cost for one (1) load test based on the assumption that each load test will have a duration of up to 24 hours.

PHASE 10 – SUBCONTRACTOR COORDINATION AND MANAGEMENT

McLaren has assumed that the drilling subcontractor(s) and PDA testing subcontractor for the existing piles will be retained directly by the client. McLaren will provide coordination of the subcontractors including scheduling field operations, direct field oversight, and management of operations during the investigation and testing phases.

SCHEDULE

The preliminary subsurface investigation will begin approximately two to three weeks after receipt of an executed proposal and retainer, subject to drilling subcontractor availability. We anticipate that the subsurface exploration program will have a duration of up to six days. The geotechnical report be provided within three weeks of completion of the subsurface investigation.

Our supplemental field investigation will need to be coordinated with the construction schedule following completion of the demolition of the existing building. We anticipate that the supplemental test borings and test pits can be completed in up to 11 days. Our final geotechnical report will be issued within 3 weeks of completion of the supplemental field investigation.

Performance of PDA testing on existing piles is anticipated to require 4 days to complete for 20 piles; if 40 piles are required to be tested the duration of testing is anticipated to be 7 days.

FEE

McLaren proposes to provide the above Scope of Services for a Lump Sum Fee. Additional services outside of the scope of this proposal shall be performed upon your approval at an hourly basis in accordance with the hourly rate table below.

GEOTECHNICAL ENGINEERING

Phase 01 - Preliminary Field Investigation	\$	8,600
Phase 02 - Preliminary Geotechnical Engineering and Report	\$	7,200
Phase 03 - Supplemental Field Investigation	\$	16,200
Phase 04 - Final Geotechnical Engineering and Report	\$	10,000
Phase 05 - Geotechnical Coordination and Support	\$	3,000
Phase 06 - Signed and Sealed Driving Records	\$	3,000
Phase 07 - Static Load Test Observation (Unit Price per 24 hr Test)	\$	5,000
Phase 08 - Subcontractor Coordination and Management	\$	<u>7,000</u>

TOTAL LUMP SUM **\$ 60,000**

Our services for field oversight during the Existing Pile Testing and Pile Installation Observation Phases (Phases 04 and 07, respectively) shall be billed according to daily rates shown below:

Non-P.E. Daily Rate	\$	1,300
P.E. Daily Rate	\$	1,800

Note: Total Fee does not include subcontractor fees, which have been provided below.

The following are the estimated additional costs for the drilling subcontractor and soil testing laboratory to be used for budgetary purposes. Actual fees may vary. We assume that the subcontractors will be retained by the client.

Drilling Subcontractor Fee (Preliminary Investigation)	\$	26,900
Drilling Subcontractor Fee (Supplemental Investigation)	\$	37,300
PDA Testing (20 piles)	\$	45,000
PDA Testing (40 piles)	\$	74,000
Soils Laboratory Fee	\$	5,000

REIMBURSABLE EXPENSES

The following expenses shall be reimbursed at 1.1 times our cost:

1. Reproduction, mailing and courier costs associated with the execution of this contract.
2. Travel costs for meetings and site visits.

EXCLUSIONS

Specifically excluded from this proposal and billable at the hourly rates defined below are the following:

1. The fees are based on the assumption that all components will be designed concurrently and there will be no incremental bid packages.
2. Permits or approvals except as noted above.
3. Permit expediting or application fees.
4. Topographic and Boundary Survey.
5. Subdivision of the property.
6. Water supply system, wells, hydrogeologic studies, or water storage tanks.
7. Design of grading, drainage, utility or site improvements.
8. Any architectural or structural design work related to buildings.

9. Structural design of retaining walls or other site features.
10. Landscape or lighting design.
11. Design of Support of Excavation Systems.
12. Design and Permitting of Dewatering Systems.
13. Sewage pump station designs.
14. Design of septic or other onsite wastewater disposal system.
15. Improvements to existing offsite streets.
16. Traffic studies.
17. Archeology or cultural resource studies.
18. Environmental studies, including completion of an EAF.
19. Preparation of Environmental Impact Statement (EIS) in accordance with State Environmental Quality Review Act (Article 8 of the Environmental Conservation Law (SEQRA)).
20. Wetland delineation, flagging, or permitting.
21. Special Inspections per the Building Code or full time observation of construction.
22. Site assessment and inspections required for the NYSDEC, SPDES General Permit for Stormwater Discharges from Construction Activity, Permit No. GP-0-15-002.
23. The Project will be subject to government authorities having jurisdiction for approval of the Project. After the Client directs McLaren to proceed with the Approval phase, substantial changes to the design of the Project due to changes of scope directed by the Client, changes in regulatory requirements after the start of the Project or due to the discretionary approval authority of the public agencies shall be additional services.
24. Weather conditions, including snow, wind, rain and/or other natural or unnatural occurrences may hinder field operations and may require rescheduling of part or all of the related field work. Should such conditions arise, McLaren shall not be held liable for related delays to the work schedule.
25. McLaren excludes all environmental testing, permitting and inspection, and asbestos remediation unless noted otherwise above.
26. MTA Transit Approval Permit.
27. NYC DOT Permit.
28. NYC DEP Drilling Permit.

This proposal is subject to the terms and conditions which follow and shall remain valid only until March 11, 2022, unless it is accepted as a contract. Hourly rates defined above are subject to annual revision April 1st.

Should you find this proposal acceptable, kindly sign and return one copy to serve as our contract. Work shall commence upon receipt of signed contract and retainer.

Very truly yours,

The Office of
M.G. McLaren Engineering and Land Surveying, P.C.



Gul B. Khan, P.E.
Senior Vice President



Jesse M. Volpe, P.E.
Associate

PREPARER INITIALS ALL CAPS/reviewer initials lowercase

cc: JMV, CLL, dmb, gbk – Internal
McLaren File No. 210779.02 Rev.01

ACCEPTED:

For	United Pike Development JC, LLC	Title	Date
	Authorized Person		

TERMS AND CONDITIONS

1. **SERVICES TO BE PROVIDED.** M.G. McLaren Engineering and Land Surveying, P.C. (McLaren), through and by its officers, employees, and subcontractors, (hereinafter McLaren) is an independent consultant and agrees to provide Client, for its sole benefit and exclusive use, consulting services set forth in our proposal. No third-party beneficiaries are intended by this agreement.
2. **PAYMENT TERMS.** Client agrees to pay McLaren's invoice upon receipt. If payment is not received within 30 days from the Client's receipt of McLaren's invoice, Client agrees to pay a service charge on the past due amount at the greater of 1% per month or the allowable legal rate, including reasonable attorney's fees and expenses if collected through an attorney. No deduction shall be made from McLaren's invoice on account of liquidated damages unless expressly included in the Agreement. Client receipt of invoice will be presumed three days after mailing by McLaren first class with adequate postage attached, or date of confirmed email transmission. Time is of the essence for this provision.

Client payment to McLaren shall not depend or be conditioned upon payment by the Owner or others to Client. Client's obligation to pay McLaren for its services shall be independent of payment by the Owner to Client.

Because most of the engineer's (McLaren) involvement in the project occurs in the early stages of the project, Client agrees to pay McLaren at a percentage commensurate with the actual amount of work accomplished by other members of the project. If there is a Construction Administration (CA) component to this project, Client further agrees to compensate McLaren appropriately for all work expended on the project regardless of the percentage of work accomplished by the Architect or other team members.

3. **TERMINATION.** Either party may terminate this Agreement without cause upon 30 days prior written notice. This Agreement will terminate automatically upon the insolvency of Client. In the event Client requests termination prior to completion of the proposed services, Client agrees to pay McLaren for all reasonable charges incurred to date and associated with termination of the work, plus a termination fee of 10% of the total fee under this agreement.

If the Project is suspended for more than thirty consecutive days, for reasons other than McLaren's fault, McLaren shall be compensated for services performed prior to such suspension. When the project is resumed, our compensation shall be equitably adjusted.

If Client abandons the Project because of the Owner's abandonment of the Project for more than ninety consecutive days, McLaren may terminate this Agreement by giving written notice. McLaren shall be compensated for all services performed prior to such abandonment, plus 10% of McLaren total fee under this Agreement, together with reimbursables then due.

4. **STANDARD OF CARE.** McLaren will perform its services using that degree of care and skill ordinarily exercised under similar conditions by reputable members of McLaren's profession practicing in the same or similar locality at the time of service. No other warranty, express or implied, is made or intended by McLaren's proposal or by its oral or written reports.
5. **INSURANCE.** Both McLaren and Client will effect and maintain insurance to protect themselves from claims arising out of the performance of professional services under this Agreement and caused by any error, omission or negligent act for which we are legally liable. Both McLaren and Client will maintain this insurance in force, if available, after the completion of professional services under this Agreement until the expiration of any applicable statutes of limitation. In the event there is no such statute specifically applicable to design and construction of improvements to real property, this insurance, if available, shall be maintained in force by both parties for a period of six (6) years after the date of substantial completion of the Project as agreed to.

Unless otherwise agreed, both parties will effect and maintain insurance to protect ourselves from claims under workers' or workmen's compensation acts; from claims for damages because of bodily injury, including personal injury, sickness, disease, or death of any employees or of any other person;

from claims for damages because of injury to or destruction of property including loss of use resulting therefrom; and from damage to or destruction of property including valuable papers and records coverage and including loss of use resulting therefrom.

The insurance required above shall be as provided below. McLaren and Client will file with each other certificates of insurance for each type and amount prior to commencement of work under this agreement:

Professional Liability Insurance (Errors & Omissions), with a limit of \$2,000,000 for each claim and \$2,000,000 in the aggregate.

Comprehensive General Liability - \$1,000,000 per occurrence, \$2,000,000 Aggregate Bodily Injury and Property Damage; Blanket Contractual All Operations Completed Operations; \$1,000,000 Personal Injury A.B.C., plus \$5,000,000 Excess Liability Umbrella.

Worker's Compensation/Coverage A - Statutory/Coverage B - \$1,000,000

6. **SITE OPERATIONS.** Client will arrange for right-of-entry with safe access to the property for the purpose of performing project management, studies, tests, and evaluations pursuant to the agreed services. Client represents that it possesses necessary permits and licenses required for its activities at the site.

McLaren will take reasonable precautions to minimize damage to the property caused by its operations. Unless otherwise stated in McLaren's proposal, the Contract Sum does not include cost of restoration due to any related damage, unless such damage directly results from McLaren's negligent actions. If Client requests McLaren to repair such damage, it will be done at an appropriate additional cost to be paid by Owner.

McLaren shall not have control over, charge of, or responsibility for the construction means, methods, techniques, sequences, or procedures, or for safety precautions and programs in connection with the work of the contractor (Work), nor shall McLaren be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents.

7. **UNFORESEEN CONDITIONS OR OCCURRENCES.** It is possible that unforeseen conditions or occurrences may be encountered at the site which could substantially alter the necessary services, or the risks involved in completing McLaren's services. If this occurs, McLaren will promptly notify and consult with Client, but will act based on McLaren's sole judgment where risk to McLaren's personnel is involved. Possible actions could include:

- A. Complete the original Scope of Services in accordance with the procedures originally intended in this Agreement, if practicable in McLaren's judgment.
- B. Agree with Client to modify the Scope of Services and the estimate of charges to include study of the unforeseen conditions or occurrences, with such revision agreed to in writing.
- C. Terminate the services effective on the date specified by McLaren in writing.

8. **DOCUMENTS.** McLaren will furnish Client the agreed upon number of written reports and supporting documents. These instruments of service are furnished for Client's exclusive internal use and reliance, use of Client's counsel and for regulatory submittal in connection with the project provided for in this Agreement, but not for advertising or other type of distribution, and are subject to the following:

- A. All documents including paper documents and electronic files generated by McLaren under this Agreement shall remain the sole property of McLaren. Any unauthorized use or distribution of McLaren's work shall be at Client's and recipient's sole risk and without liability to McLaren.
- B. If Client desires to release, or for McLaren to provide, our documents to a third party not described above for that party's reliance, McLaren will agree to such release provided McLaren receives written acceptance from such third party to be bound by acceptable terms and conditions similar

to this Agreement. Documents provided for disclosure of information only will not require separate agreement. Client acknowledges and agrees to inform such third party that McLaren's documents reflect conditions only at the time of the study and may not reflect conditions at a later time. Client further acknowledges that such request creates potential conflict of interest for McLaren and by this request Client waives any such claim if McLaren complies with the request.

- C. Client agrees that all documents furnished to Client or Client's agents or designees, if not paid for will be returned upon demand and will not be used by Client or any other entity for any purpose whatsoever. Client further agrees that documents produced by McLaren pursuant to this Agreement will not be used for any project not expressly provided for in this Agreement without McLaren's prior written approval.
 - D. Client shall furnish documents or information reasonably within Client's control and deemed necessary by McLaren for proper performance of our services. McLaren may rely upon Client-provided documents in performing the services required under this Agreement; however, McLaren assumes no responsibility or liability for their accuracy. Client-provided documents will remain the property of Client, but McLaren may retain one confidential file copy as needed to support our report.
9. **CLAIMS.** The parties agree to attempt to resolve any dispute without resort to litigation, including use of mediation, prior to filing of any suit. However, in the event a claim results in litigation, and the claimant does not prevail at trial, then the claimant shall pay all costs incurred in pursuing and defending the claim, including reasonable attorney's fees.
10. **OPINIONS OF COST.** If included in our scope of services, McLaren will use its best efforts and experience on similar projects to provide realistic opinions of costs for remediation or construction as appropriate based on reasonably available data, McLaren's designs, or McLaren's recommendations. However, such opinions are intended primarily to provide information on the order of magnitude or scale of such costs and are not intended for use in firm budgeting or negotiation. Client understands actual costs of such work depend on regional economics, local construction practices, material availability, site conditions, weather conditions, contractor skills, and many other factors beyond McLaren's control.
11. **TESTIMONY.** Should McLaren or any McLaren employee be compelled by law to provide testimony or other evidence by any party, whether at deposition, hearing, or trial, in relation to services provided under this Agreement, and McLaren is not a party in the dispute, then McLaren shall be compensated by Client for the associated reasonable expenses and labor for McLaren's preparations and testimony at appropriate unit rates. To the extent the party compelling the testimony ultimately provides McLaren such compensation, Client will receive a credit or refund on any related double payments to McLaren.
12. **CONFIDENTIALITY.** McLaren will maintain as confidential any documents or information provided by Client and will not release, distribute, or publish same to any third party without prior permission from Client, unless compelled by law or order of a court or regulatory body of competent jurisdiction. Such release will occur only after prior notice to Client.
13. **PRIORITY OVER FORM AGREEMENTS/PURCHASE ORDERS.** The Parties agree that the provisions of these terms and conditions shall control over and govern as to any form writings signed by the Parties, such as Client Purchase Orders, Work Orders, etc., and that such forms may be issued by Client to McLaren as a matter of convenience to the Parties without altering any of the terms or provisions hereof.
14. **SURVIVAL.** All provisions of this Agreement for indemnity or allocation of responsibility or liability between Client and McLaren shall survive the completion of the services and the termination of this Agreement.
15. **SEVERABILITY.** In the event that any provision of this Agreement is found to be unenforceable under law, the remaining provisions shall continue in full force and effect.
16. **ASSIGNMENT.** This Agreement may not be assigned by either party without the prior permission of the other.

17. **INTEGRATION.** This agreement, the attached documents and those incorporated herein constitute the entire Agreement between the parties and cannot be changed except by a written instrument signed by both parties.

18. **LIMIT OF LIABILITY**

- A. In the event the Owner or Client consents to, allows, authorizes, or approves of changes to any plans, specifications or other construction documents, and these changes are not approved in writing by McLaren, the Client recognizes that such changes and the results thereof are not the responsibility of McLaren. Therefore, the Client agrees to release McLaren from any liability arising from the construction, use or result of such changes. In addition, the Client agrees, to the fullest extent permitted by law, to indemnify and hold the design Professional and all his employees, officers, and directors harmless from any damage, liability, or cost (including reasonable attorneys' fees and costs of defense) arising from such changes, except only those damages, liabilities and costs arising from the sole negligence or willful misconduct of McLaren or its employees, officers, or directors.
- B. Nothing contained in this Agreement shall create a contractual relationship with or a cause of action in favor of a third party against either the Client or McLaren. McLaren's services under this Agreement are being performed solely for the Client's benefit, and no other entity shall have any claim against McLaren because of this Agreement or the performance or nonperformance of services hereunder. The Client agrees to include a provision in all contracts with contractors and other entities involved in this project to carry out the intent of this paragraph.
- C. The Client agrees to limit McLaren's liability and his or her consultants to the Client and to all Construction Contractors and Subcontractors on the project, due to McLaren's negligent acts, errors, or omissions, such that the total aggregate liability of McLaren to all those named shall not exceed McLaren's total fee for services rendered on this project, including legal fees.

The Client shall make no claim for professional negligence, either directly or in a third-party claim, against McLaren unless the Client has first provided McLaren with a written certification executed by an independent design professional currently practicing in the same discipline as McLaren and licensed in the State of this project. This certification shall: a) contain the name and license number of the certifier; b) specify each and every act or omission that the certifier contends is a violation of the standard of care expected of an Engineer performing professional services under similar circumstances; and c) state in complete detail the basis for the certifier's opinion that each such act or omission constitutes such a violation. This certificate shall be provided to McLaren not less than thirty (30) calendar days prior to the presentation of any claim or the institution of any mediation or judicial proceeding.

- D. The Client shall promptly report to McLaren any defects or suspected defects in McLaren's work or services of which the Client becomes aware, so that McLaren may take measures to minimize the consequences of such a defect. The Client warrants that he or she will impose a similar notification requirement on all contractors in his or her Owner/ Client contract and shall require all subcontracts at any level to contain a like requirement. Failure by the Client, and the Contractors or Subcontractors to notify McLaren, shall relieve McLaren of the costs of remedying the defects above the sum such remedy would have cost had prompt notification been given.
- E. Payments to McLaren shall not be withheld, postponed, or made contingent on the construction, completion, or success of the project or upon receipt by the Client of offsetting reimbursement or credit from other parties causing Additional Services or expenses. No withholdings, deductions or offsets shall be made from McLaren's compensation for any reason unless McLaren has been found to be legally liable for such amounts.
- F. If, due to McLaren's error, any required item or component of the project is omitted from McLaren's construction documents, McLaren shall not be responsible for paying the cost to add such item or component to the extent that such item or component would have been otherwise necessary to the project or otherwise adds value or betterment to the project. In no event will McLaren be

responsible for any cost or expense that provides betterment, upgrade, or enhancement of the project.

- G. All legal actions by either party against the other arising out of or in any way connected with the services to be performed hereunder shall be barred and under no circumstances shall any such claim be initiated by either party after three (3) years have passed from the date McLaren concluded rendering professional services, issuance of the Certificate of Completion or Certificate of Occupancy, whichever is sooner, unless McLaren's services shall be terminated earlier, in which case the date of termination of this Agreement shall be used.
- H. It is intended by the parties to this Agreement that McLaren's services in connection with the project shall not subject McLaren's individual employees, officers, or directors to any personal legal exposure for the risks associated with this project. Therefore, and notwithstanding anything to the contrary contained herein, the Client agrees that as the Client's sole and exclusive remedy, any claim, demand, or suit shall be directed and/or asserted only against McLaren, a New York corporation, and not against any of McLaren's employees, officers, or directors.
- I. Notwithstanding any other provision of this Agreement, and to the fullest extent permitted by law, neither the Client nor the Consultant, their respective officers, directors, partners, employees, contractors or subconsultants shall be liable to the other or shall make any claim for any incidental, indirect or consequential damages arising out of or connected in any way to the Project or to this Agreement. This mutual waiver of damages shall include, but is not limited to, loss of use, loss of profit, loss of business, loss of income, loss of reputation or any other incidental, indirect, or consequential damage that either party may have incurred from any cause of action including negligence, strict liability, breach of contract and breach of implied warranty. Both the Client and the Consultant shall require similar waivers of consequential damages protecting all the entities or persons named herein in all contracts and subcontracts with others involved in this project.
- J. Because evaluation of the existing structure requires that certain assumptions be made regarding existing conditions, and because some of these assumptions cannot be verified without expending additional sums of money or destroying otherwise adequate or serviceable portions of a structure, the Client agrees, to the fullest extent permitted by law, to indemnify and hold McLaren harmless from and against any and all damage, liability and cost, including reasonable attorneys' fees and defense costs, arising or allegedly arising out of the professional services under this Agreement, except for the sole negligence or willful misconduct of McLaren.



February 4, 2022

Mr. Jesse M. Volpe, P.E.
McLaren Engineering Group
131 West 35th Street, 4th Floor; New York, NY 10001

Phone: (212) 324.6300 x0045

E-Mail: jvolpe@mgmclaren.com

Re: Proposal for Dynamic Pile Testing and Wave Equation Analysis
Parking Lot Project (Assessment of existing piles)
Binghamton, NY

GRL Job Estimate No. 7500B

Mr. Volpe:

Thank you for your interest in GRL Engineers, Inc. GRL is the largest and most experienced dynamic testing firm in the world and maintains its principal office in Cleveland, Ohio. Our firm employs highly qualified civil or geotechnical engineers who specialize in dynamic testing methods and analyses. The following is our cost proposal to perform high strain dynamic testing for the above referenced project using the Pile Driving Analyzer (PDA) and related programs in accordance to ASTM D4945. Based on discussion, the scope of work includes testing of 20 to 40 existing H-piles to a reported ultimate compressive capacity of 150 to 200 kips.

For this pile size and assumed soil conditions, we plan to use our APPLE 7 or 6 drop weight system utilizing a single 1.0 or 4.5-ton drop weight. We request that the proposed test piles have a stick-up of at least 2.0 ft, but no more than 3.0 ft, above grade to facilitate attachment of the measurement gages. During testing, dynamic measurements will be collected under several impacts. Normally a minimum crane boom height of 50 ft is needed to move the APPLE hammer, although a large excavator may be used with both systems, or, a skid-steer/forklike can be used with the APPLE 7 system.

During testing, dynamic measurements will be collected under several impacts, starting with a relatively short drop.

CAPWAP analysis must be used to estimate pile capacity. CAPWAP analysis provides information regarding the resistance distribution and total mobilized capacity. We plan to perform a CAPWAP analysis for the test shaft. A comprehensive report will be submitted following the testing. Additionally, a Wave Equation may be performed for determining the suitability for Dynamic Testing (if requested).

Wave Equation Analysis (GRL WEAP) Report, if applicable

- Initial Bearing Graph Analysis Report \$ 1,500
- *Additional related analyses, each* \$ 500

The following unit rates show our charge for the initial test day and our charge for additional consecutive days of testing if required. The standby rates for both our engineer and APPLE hammer are also given. Included is also the unit charge for CAPWAP analysis and reporting.

High Strain Dynamic Pile Testing and Reporting

1.	Initial test day (weekday)	\$ 17,000
	Initial test day (weekend or Holiday)	\$ 19,000
	- Two Engineers mobilized and demobilized	
	- Hammer mobilized and demobilized	
2.	Additional consecutive test day (weekday)	\$ 6,000
	Additional consecutive day (Weekend or Holiday)	\$ 6,800
	- Same mobilization for personnel	
	- Hammer remains on-site from previous day	
3.	Additional non-consecutive test day (weekday)	\$ 6,500
	Additional non-consecutive day (Weekend or Holiday)	\$ 7,800
	- Same mobilization for personnel	
	- Hammer remains on-site from previous day	
4.	Standby, Engineer, PDA equipment and APPLE, per day	\$ 4,000
5.	Hammer standby on-site, per week (if applicable)	\$ 500
6.	Analysis and report (including CAPWAP), per pile	\$ 500
	(with a minimum report charge of \$1,000)	

The above lump sum daily rate includes GRL's personnel, PDA equipment, APPLE drop hammer, travel and living expenses, and APPLE transportation to and from the project. If necessary for mobilization, the day prior to the first day of testing and the day after the final day of testing will not be charged any rate as they are considered a part of the mobilization/demobilization period covered under the "Test Day" charge (typically performed during the initial test day). Multiple piles can be tested in one day given appropriate site conditions. **Assuming four (4) day of testing (1 initial weekday, 3 additional consecutive weekdays) would be required to test twenty (20) piles, along with appropriate analysis and reporting for the tested piles, the total estimated cost would be \$45,000. Alternatively, if testing is to be performed on forty (40) piles in seven (7) days (1 initial weekday, 2 additional non-consecutive days, and 4 additional consecutive weekdays) would be required to test forty (40) piles, along with appropriate analysis and reporting for the tested piles, the total estimated cost would be \$74,000.**

If further additional testing is requested or additional days or mobilizations are required to complete the testing due to factors beyond our control, the cost would be based on the unit rates given above.

Working conditions must be provided where our personnel can work in a safe and healthy manner. This includes the safe operation of a crane (**which the client must provide**) and movement of the APPLE drop weight system while on the site premises. Though we are able to provide advice as to the operation of the loading device, we are not in a position to actually direct the handling of heavy loads. Attached with this quote are also the operation of the APPLE 7 and 6 manuals. Please review this document as it contains information which is critical to the successfulness of the test.

We hope that this cost estimate is satisfactory. If you have any questions on this cost estimate, on dynamic testing methods or if we can be of service to you in any way, please do not hesitate to call us at (610) 459-0278.

Sincerely,
GRL Engineers, Inc.



Alex Ryberg, P.E.

Items for Performing High Strain Dynamic Testing using APPLE Loading Devices

Drilled Shafts or Piles

GRL Engineers, Inc.

[Contact Alex Ryberg - 610-960-7919 - aryberg@grlengineers.com with any questions](mailto:aryberg@grlengineers.com)

Item	Description	Provided/Performed By:	
		GRL	Client/Contractor
APPLE Loading Device	exact device project dependent - see proposal	√	
Shipping of APPLE Loading Device to and from Site	on flatbed truck	√	
Rigging equipment for assembling APPLE and performing test	in toolbox with APPLE Loading device	√	
personnel to perform rigging (set-up, testing, tear down)	certified rigger		√
Crane of sufficient capacity (at needed reach distance)	2 lines required - see proposal for APPLE weight		√
Crane operator			√
pile and site preparation	grading around pile - see proposal for details		√
plywood pile cushion (not OSB)	3/4" thick - 4 cut pieces same size as pile for each test pile (square pieces are ok)		√
	1/4" thick - 1 cut piece same size as pile for each test pile (square piece is ok)		√
Stable platform to support APPLE loading device	Crane mats, cribbing, or competent surface around pile		√
Test Pile Instrumentation for Dynamic Test	instrumented day of testing	√	
Thermal Integrity Profiling (TIP) wire	1 for each test pile	√	
TIP data collector (TAP box)	number needed based on project schedule	√	
TIP wire installation	zip tied to center bar or full length cage - instructions provided		√
data collector (TAP box) connection	plug in after pile installation - instructions provided		√
training for TIP wire installation (if necessary)	training onsite if requested	√	
TIP data download	on dynamic test day	√	

OPERATION OF THE APPLE-VII

August 2021

NOTE: Operation of the APPLE system equipment involves heavy loads and should only be conducted by personnel experienced in handling heavy loads and in construction procedures. GRL Engineers, Inc. is an engineering firm and is not authorized to operate heavy equipment on construction sites where all OSHA rules shall be observed.

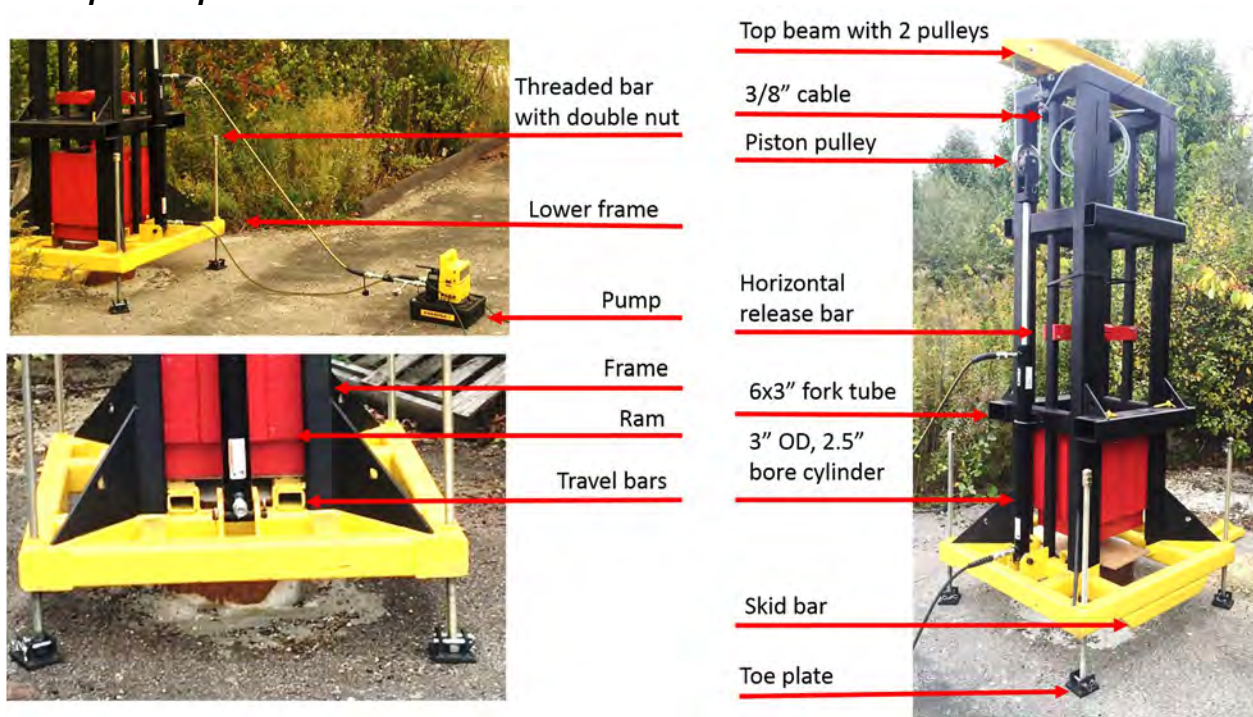
Components of the APPLE VII system

The dynamic loading system, APPLE-VII, consists of (see also Figure 1):

- Frame with four adjustable legs/foot plates (approximately **1400 lbs**)
- Top cross beam with 2 pulleys
- Single ram section (approximately **2100 lbs**)
- Free release device
- Horizontal release bar
- Hydraulic cylinder
- Cylinder pulley assembly
- Hydraulic pump, pressure gage, flow adjuster
- 2 hydraulic hoses
- Electric hydraulic pump
- Two travel bars with pins
- 2 bungee cords for cable restraint or cylinder support during travel
- 15" adjustable wrench for leg adjustment, 1-1/2" < jaw opening required
- Chain
- Miscellaneous shackles
- 2 hoist rings, 1/2" – 13 thread, 3/4" long - for alternative lifting of ram with chain
- Tool box
- 3/8" galvanized wire rope
 - Rated Capacity: **1.4 Tons**
 - Break Strength: **7.55 Tons**

Total weight of the complete APPLE VII system is **4000 lbs.**

Principle of Operation



The unit is designed such that all testing operations (raising, lowering, and dropping ram), with the exception of placing the unit in position above the test pile, can be performed by the free standing system. When the 36 inch long hydraulic cylinder is retracted and the release device has been engaged on top of the ram, the ram will rise. The cable lifting the ram is then tensioned by approximately 2100 lbs. The cylinder is operating against a force of 4200 lbs and the ram rises twice as fast as the cylinder retracts, allowing for a maximum drop height of 6 ft.

The cylinder bore is 2.5" and the piston rod diameter is 1.5". The 4200 lb load causes a pressure of 1350 psi in the cylinder. The cylinder is rated for 3000 psi while the the pump is rated for 10000 psi. **Care must be taken to ensure that the pressure indicator never exceeds 2000 psi as this would indicate a malfunction.** It is expected that it takes approximately 2 minutes to raise the ram to its maximum height.

Ram release is accomplished by forcing a release device with two oversize cams through a horizontal release bar. As the release device travels through the horizontal release bar, the release jaws open which releases the ram.

Required Site Equipment

To unload the APPLE VII and place it above the test pile, site equipment capable of safely lifting 4000 lbs is required. Ideal equipment may include a site movable fork lift, excavator, crane, or construction equipment equipped with 2 forks that are at most 5 inches wide. The site equipment selected by the contractor is required for unloading and loading the APPLE VII, transporting the system between test pile locations, and also for positioning the system above the test pile.

Also required is a 2 kW (min), 115 Volt power source for the hydraulic pump.

Work Area

It is critical that the frame is leveled prior to lifting and releasing the ram. For this reason a level and competent working surface must be available around the test shaft. This area should consist of at least a 3 feet radius around the center of the test shaft.

The four legs of the frame support the weight of the frame and ram. Therefore, each leg and the area under is required to support approximately ½ ton. While some blocking is shipped with the system, additional blocking may be needed, particularly where the work area is either very soft, highly uneven, or where the pile top is more than 2 feet above grade.

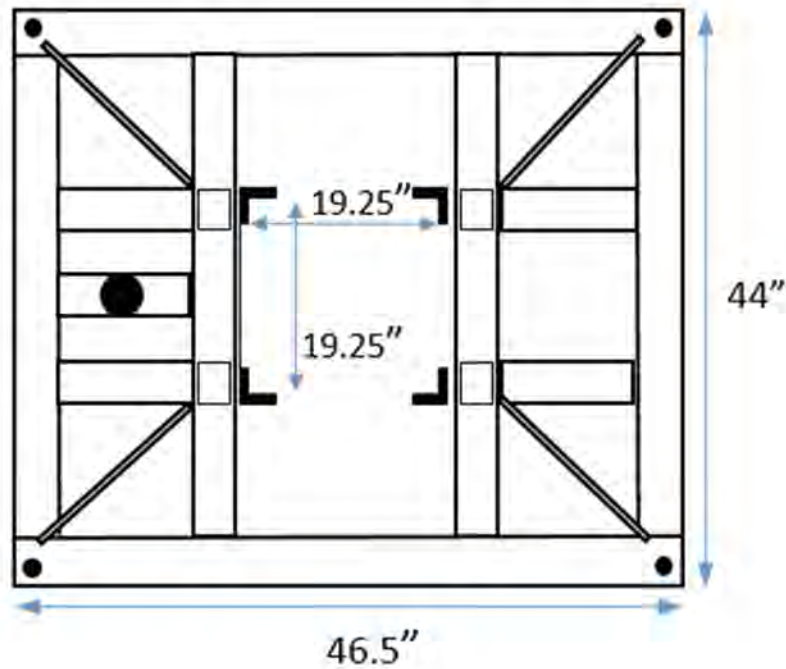


Figure 2. Footprint of APPLE VII

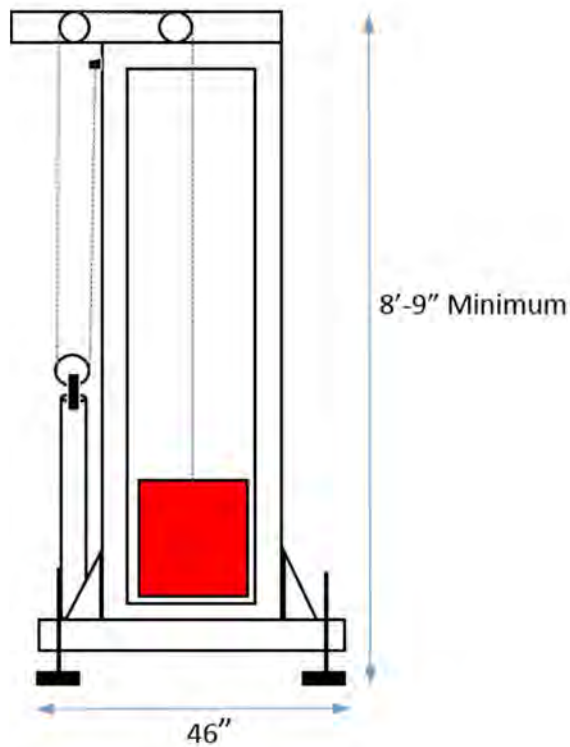


Figure 3. APPLE VII Profile View

Placing the APPLE VII on Test Pile

The frame, cylinder, and ram arrive at the site assembled, typically standing upright on the truck or trailer. In this position it can be removed from the carrier and then mobilized to the test pile location. Using a fork lift, the assembly can be moved by inserting the forks in the 6x3" fork tubes. If a crane is used, shackles can be attached to the fork tube gussets. In this case the site then has to provide 4 slings.

1. It is recommended that prior to moving the unit above the pile, the pile is instrumented and a cushion is to be placed on the pile top. Using an instrumented section placed onto the pile top simplifies the testing operation, in general, however, it is necessary to attach at least one accelerometer to the pile top. If the pile is already instrumented prior to placing the APPLE VII over it, care should be taken not to damage the instrumentation.
2. The adjustable foot plates/threaded bars have to be set to the required height. The system should be adjusted high enough so that the pile top is within a short distance from the horizontal Lower Frame tubes. In order to limit the free threaded leg bar length underneath the Lower Frame (max. of approximately one foot), blocking should be employed.
3. Center and plumb the unit.
 - For raising the legs during plumbing, use the 15" wrench on the lower of the two nuts at the top of the threaded bars.
 - For lowering the legs during plumbing, use a wrench on the upper one of the two nuts at the top of the threaded bars.

Connecting the pump to the cylinder

Refer to Figure 4 and to the photos in the Appendix for an understanding of the hydraulic lifting system. The Enerpac pump has a three position lever that directs fluid flow to the corresponding hose. The middle position exerts zero pressure. For proper operation it is important to make (or check) the following connections. **Improper connections can cause damage to the system.**

- The top cylinder port should be connected to pressure gage, flow control unit and pump port 1. When the lever is at the No. 1 position and the pump is operated, pressure builds up in the upper part of the cylinder which retracts the piston and raises the ram. In this operation the flow control has no effect (it allows for flow from the pump to the cylinder regardless of the flow setting).
- The bottom cylinder port should be connected directly to pump port 3. This line allows hydraulic fluid to move to and from the bottom port which is usually unpressurized in the designed operation of the APPLE VII. An exception is when the release device has to be lowered without the ram pulling. Then it is necessary to operate the pump to raise the piston at very low pressures.
- If the ram has to be controllably lowered (**not dropped**) the flow in the line between No. 1 and the top cylinder port has to be restricted and that is accomplished with the flow control and the pump handle at the No. 3 setting. The bottom line allows for unrestricted flow to the pump.
- If the release device is to be lowered after ram dropping, the flow control is opened (counter clockwise) and the pump is operated with the handle at No. 3. This will push the piston up.

It is important that this system is well understood and to follow exactly the following instructions when operating the pump and raising or lowering or releasing the ram.

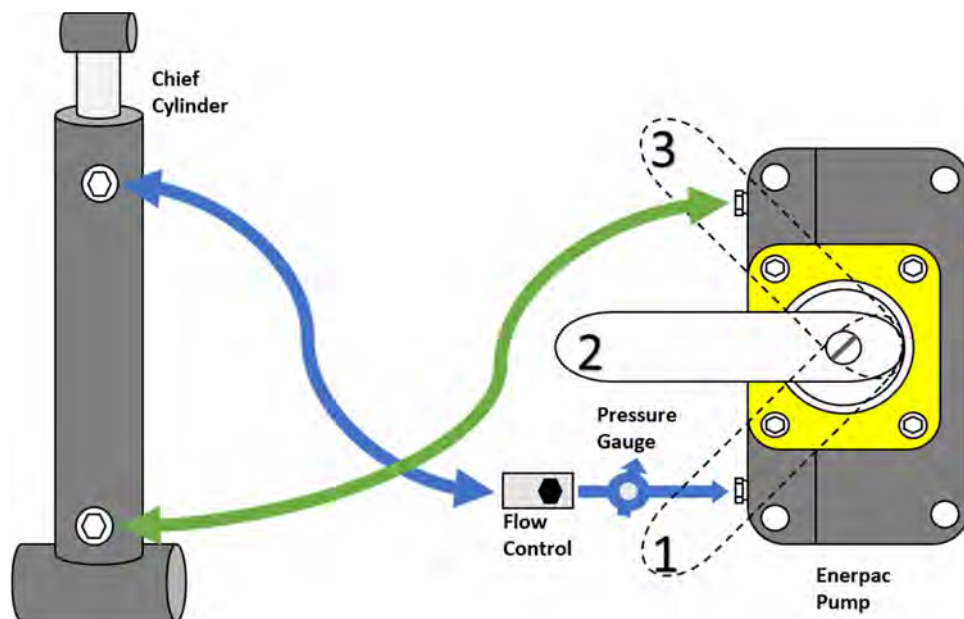


Figure 4. APPLE VII Hydraulic Hose Connections

Operation of the APPLE 7

Enerpac Valve Position 1: Retract piston and lift ram weight (flow control valve must be open when retracting ram – 10 turns counter clockwise)

Enerpac Valve Position 2: Neutral - in this position flow is unrestricted in either line. **DO NOT TURN THE VALVE TO POSITION 2 OR 3 WHILE THE RAM IS SUSPENDED UNLESS THE FLOW CONTROL IS CLOSED (ALL THE WAY CLOCKWISE) OR SLIGHTLY OPENED TO EFFECT CONTROLLED RAM LOWERING.**

Enerpac Valve Position 3: Extend piston and reset system for the next lift/drop. **DO NOT TURN THE VALVE TO POSITION 2 OR 3 WHILE THE RAM IS SUSPENDED UNLESS THE FLOW CONTROL IS CLOSED (ALL THE WAY CLOCKWISE) OR SLIGHTLY OPENED TO EFFECT CONTROLLED RAM LOWERING.**

Here are the individual steps of operation that should be taken to effect the dynamic load test with the APPLE VII.

1. Connect the hydraulic hoses to pump and cylinder. It is important that the hoses are connected to the proper cylinder ports (see Figure 4). Do not put any undue force on the hose connections, in particular, perpendicular to the connectors. **Completely tighten the Quick-Connect sleeves.**
2. Ensure the cylinder can move freely about its lower pivot point by removing any rigid restraint.
3. Operate the pump **at Position 3** with the flow control valve opened (10 rotations counterclockwise) to extend the jack sufficiently so that the free release device can be lowered and engaged (close it manually on the rams pick-up pin).
4. Operate the pump at **Position 1 and the flow control slightly open** and put a slight tension on release device and cable.
5. Move the horizontal release bar to the desired release fall height using two pins with cotter pins.
6. Restrain the 3/8" cable above the horizontal release bar with bungee cords to prevent major whipping after release of the ram.
7. Install instrumentation if not already installed. If it is necessary to raise the ram for gage attachment, **then the ram must be raised to a position where it can be completely and safely blocked with substantial material, e.g., at least two 4x4 or one 6x6. Never work underneath the unit while the ram is supported by the cylinder/release device.**
8. Operate the pump **at Position 1 with the flow control slightly open** to take all of the ram weight off the travel bars without raising the ram more than 1/2" above the travel bars.
9. Re-plumb the unit and assure the release device is still closed. If an adjustment has to be made, it may be necessary to lower the ram until its weight is at least partially taken off the hydraulics.
10. After plumbing has been achieved, slightly raise the ram and then remove the travel bars.
11. **Note it is important that the unit remains vertical after the full ram weight is on the legs.**
12. All personnel is to **stand away at least 10 ft** from the unit before raising the ram to the desired drop height.
13. To raise the ram for a drop test, operate the pump at **Position 1** with the flow control valve completely closed. As soon as the release device moves through the horizontal release bar, the ram will be released. Immediately stop pumping and thus raising the ram any further. **See also next section for an important safety warning.**

14. Go to step 3. To prepare for the next impact.

Further Suggestions and Precautions

IMPORTANT: If the release device does not open, immediately STOP lifting the ram and refer to the section below – Controlled Lowering of Ram. The release may not open when it is caught on some obstruction. When the release does not open the ram must be immediately lowered and the release device and the horizontal release bar must be inspected.

It is recommended to move the unit with the forks inserted in the 3x6 inch braces. Alternatively 4 shackles attached to the 3x6 inch brace gussets and four slings may be used to lift the unit by crane. Slings and shackles must be provided by the site.

Raising the ram can either be achieved using the release device or chain and shackles connecting to the 3/8" cable and the two hoist rings threaded into the top of the ram. Thus, should it be necessary, for example, to move the ram up into the frame from a low position where the release device cannot reach or where it would be potentially dangerous to use the release device, then chain and hoist rings should be used.

Controlled Lowering of Ram

Controlled lowering of the ram can be accomplished by the following (see Figure 4):

- 1) With the Enerpac pump handle/valve in Position 1 (which is used for raising the ram), **completely close the flow control valve by turning the knob/handle clockwise.**
- 2) Once the flow control valve is closed, turn the Enerpac pump handle/valve to Position 3 and slowly open the flow control valve (turning the knob/handle counter clockwise) and the ram will lower. The rate of lowering the ram can be adjusted by the flow control valve.
- 3) Close the control valve.

Lowering of the Release Device (With No Load on Release Device)

If the release device has to be lowered, the pump will need to be operated because there is insufficient weight with the release device alone to cause extension of the cylinder (see to Figure 4).

- 1) Turn the Enerpac pump handle/valve to Position 3 and open the flow control valve (turning the knob/handle counter clockwise 10 rotations). Carefully operate the pump until the release device can be engaged over the ram pick-up point.
- 2) To retest, close the flow control valve and move the Enerpac handle/valve to Position 1

Transport

It is strongly recommended to transport the unit in the upright position. The unit is approximately 9 ft tall; so it needs to be transported on a trailer no higher than 4 ft. If it is transported in horizontal position damage may occur unless care is taken so that the legs are protected and the ram is separately secured.

1. Before moving the unit to a trailer or truck:
2. Lift the ram to a position where the travel bars can be inserted underneath the ram. The ram should be controllably lowered onto the travel bars (see section above - Controlled Lowering of Ram)

3. Insert the travel bars and secure with one pin each.
4. Lower the ram onto the travel bars.
5. When the weight of the ram is on the travel bars, open the release device and retract the piston rod.
6. Retract the piston rod so that the release device is at the highest possible position. During retraction, two bungee cords are to be connected to the eye of the 3/8" dia. cable and to a cross member of the frame so that the 3/8" cable is taut during transport.
7. Disconnect the hydraulic lines at the cylinder and at the pump and protect all quick-connectors with their plastic covers.
8. Ensure the cylinder is secured and cannot fall over should the 3/8" cable slack.
9. Lift the unit and retract all four legs. The unit should be supported sitting on the two skid bars underneath the bottom frame, not on the base plates
10. Use the site equipment to lift and load the system.
11. Ensure the system is secured on the transporting equipment so it cannot tip over. Shackles can be used in the eyes in the gusset plates to assist in securing the unit.

Inspection and Maintenance

The unit may be subjected to high stresses in a rugged environment. The unit should be inspected prior to usage and before each drop of the ram:

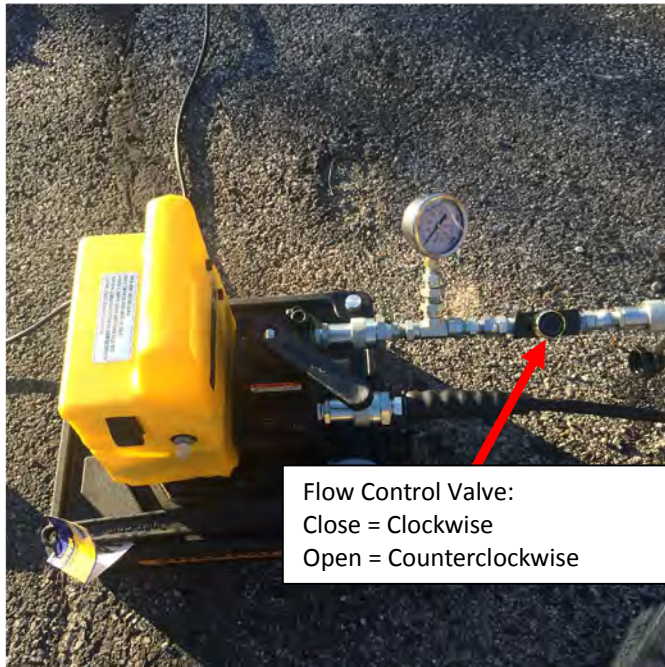
- Inspect all welds and the release device
- Inspect that the 3/8" cable for any signs of damage
- Verify that the 3/8" cable is located in the grooves of all three pulleys
- Inspect the entire length of the piston rod for any signs of wear and tear
- Clean the unit, particularly around the threads of the adjustable legs, the piston rod, the hydraulic quick connectors and all other areas that have been soiled
- Lubricate all pins, pulley bearings, bolts, except the bearing surface of the release device.

APPENDIX

Additional photos



APPLE 7 Overview



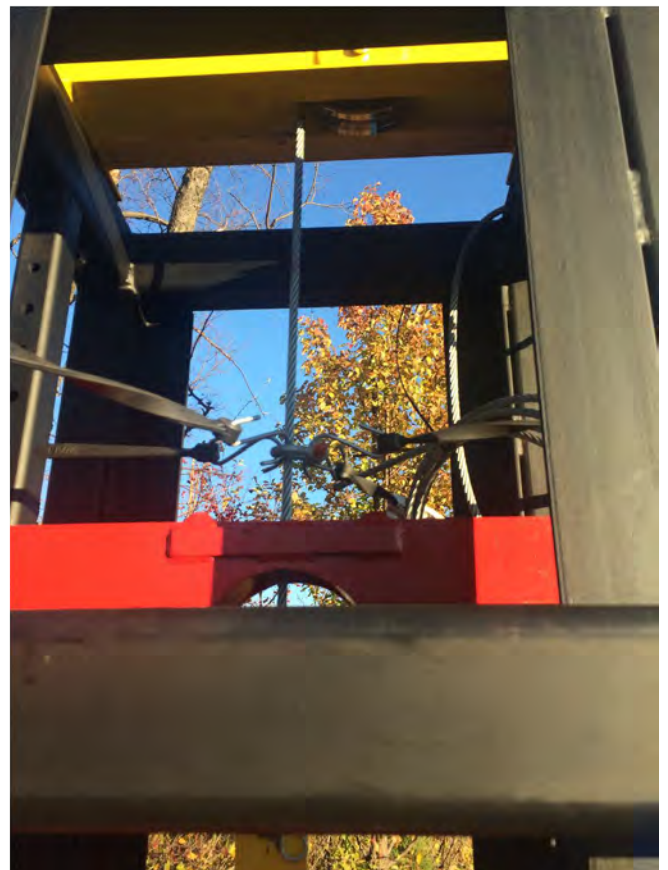
Left: Pump with Pressure Gage and Flow Control



Right: Cylinder and hose connections



Left: Travel Bars



Right: Release Bar and Anti-Whip Bungee Cords

OPERATION OF THE APPLE-VI August 2021

NOTE: Operation of the APPLE VI involves heavy loads and should only be conducted by personnel experienced in crane operation, load rigging and construction procedures. GRL is an engineering firm and is not authorized to operate heavy equipment. All OSHA rules shall be observed.

Components of the system

The dynamic loading system, APPLE-VI, consists of

- Frame with four leg extensions, each with pin and cotter pin
- One Ram section with bottom plate, center bar, top plate and wedges
- Clamp bar with bottom pin, (1) 8 ½ ton shackle and (1) ¾" x 4' cable sling
- Hydraulic clamp (50 ton jack)
- Hydraulic pump, pressure gage and hose
- Bridle bar with (1) 17 ton shackle, (4) 8 ½ ton shackles and (2) 7/8"x16' cable slings
- Two ram locking beams
- 1'x1' plywood sheets and 15" 4x6 wooden blocks
- Pile top plate (for piles up to 22" diameter)
- Two 3" wide x 16' Nylon slings
- Tool box



Required crane

Assembly and operation of the APPLE requires a 2 line crane with a capacity (at 25 ft radius) which is 8 tons. A minimum boom height of 50 ft is also needed at 25 ft radius. One line has to have a capacity in excess of the total system weight (8 tons); the second line has to be capable of lifting at least 4.5 tons. A hydraulic crane is satisfactory.

The crane is used (a) for the unloading, moving/setting up over the test pile and then loading the system back on the truck, (b) for ram lifting prior to ram release and (c) supporting the system in its vertical position during setting up/plumbing and testing.

Since the ram weight is slowly transferred from crane to frame prior to the ram release, it is avoided that the ram is suddenly released from the crane.

Work area

It is important that the frame be leveled prior to ram lifting and release. For this reason a level and competent working surface must be available around the test shaft. This area should be of at least 4 ft radius around the center of the test shaft.

The four legs of the frame have to support the weight of the frame and ram. Thus, each leg and the area under it have to support approximately 2 tons. While some blocking is shipped with the system, additional blocking has to be provided, particularly where the work area is not horizontal.

Assembly

Frame and ram come to the site assembled. The system will be lying down on the truck. It can be erected either on the truck (depends on condition/material of trailer). If for some reason it is preferred to erect the system on the ground then it should be lifted with two nylon slings (provided) and then set on the ground.



Bridle bar and associated slings and shackles are normally shipped separately and have to be attached to the pad eyes at the top of the frame prior to erection (note, shackles are rated for 8.5 ton while while load on each side of the bridle bar is less than 4 tons. Prior to erection, the hydraulic hose should be connected to the clamp and secured so as to avoid any pinching during erection. Also the second line should now be connected to the clamp bar, utilizing either the provided 4 ft sling, a basketed Nylon sling or other sling of appropriate length. The required sling



length depends on the desired ram drop height and the distance that the pile top extends above grade. Normally the 4 ft sling is adequate and provides enough room for the second line's block underneath the bridle bar for both raising the ram and lowering the block prior to ram release.

The frame/ram assembly can now be put in the vertical position by lifting bridle bar/top of frame. To avoid that the system falls into the vertical position when the center of gravity shifts from the outside to the inside of the frame, legs should be extended so as to showing 5 holes of the leg extensions. Also place wooden blocks of 4" thickness where the upper extended legs are about to land.

Place the desired amount of cushioning on the pile top.

The crane now raises the frame/assembly into its vertical position over the test pile. Two situations can arise:

- (a) The ram can be placed on the pile **if the pile has sufficient length above grade** (it may be necessary to retract the two extended legs). Once the weight of the ram is on the pile the two ram locking beams can be removed. The frame can then be lowered and plumbed.
- (b) **The pile extends very little above grade** so that the ram will be lower than in its shipping position when it sits on the pile top. In this case the frame is centered over the pile and after retracting the leg extensions completely the frame is lowered and set on the ground. The second line is then raised enough to allow for removal of the ram locking beams. The

ram is then lowered onto the pile top. It may be necessary to lift both frame and ram another time should the ram not be well centered.

Plywood and other blocking material may be used in addition to extending the legs to allow for plumbing the frame.

Note: centering can be simplified by optionally using the pile top plate which fits the ram guides.



Testing operation

The hydraulic hose is connected to the pressure gage and the hydraulic pump.



The pile is instrumented by GRL's PDA engineer.

The ram is slowly raised to the desired drop height by means of the second line (for the first impact this may only be ½ or 1 ft.)

The pump is operated to operate the hydraulic clamp. Pumping is finished at a pressure of 4000 psi. **Note: do not use more than 4000 psi pressure.**

The second line is lowered this transfers the ram weight from the second line to the frame through the hydraulic clamp.

Note 1: Stay clear of frame and assure that it legs are properly supported: Recheck frame plumpness.

Note 2: Lower second line far enough so that it is not catching the falling ram.

Note 3: If replumbing is necessary, slightly raise the frame/ram with the main line and add additional blocking. If it is not possible to achieve proper plumping in this manner, the ram has to be picked up again by the second line, the hydraulic pressure released, the ram set down on the pile and then the frame position adjusted.

Drop the ram by releasing the hydraulic pressure.

Finishing up and loading

After the pile(s) have been tested, proceed as follows:

- Remove instrumentation from the test pile.
- Disconnect hydraulic line from the pressure gage and pump, roll up and secure to frame.
- Raise either frame or ram to the location where ram locking beams can be re-inserted in the upper set of slots. Secured ram locking beams with pins and cotter pins.
- Lift ram/frame assembly enough to extend two legs; show five sets of holes. The two legs to be extended are located on the ladder side.
- Set the extended legs on two wooden blocks.
- Lower the frame until it is in the horizontal position.
- Retract the extended legs.
- Remove bridle bar shackles/slings from pad eyes and store in tool box.
- Remove hydraulic line from clamp and store in tool box.
- Use Nylon slings to complete the loading onto the truck.



Dynamic Load Testing with APPLE Systems

APPLE Load Testing Systems provide an attractive alternative to static load testing any type of deep foundation. These systems have modular ram weights ranging from 1 to 80 tons, and can be used for dynamic load testing or rapid load testing. In a dynamic load test application, APPLE Load Testing Systems can mobilize a capacity as large as 8000 tons. APPLE Load Testing Systems may be delivered to projects anywhere in the USA, Canada and Mexico.

APPLE Load Testing System

When a suitable ram is not available at the testing location, GRL chooses from its family of APPLE Load Testing Systems that can be configured for a wide range of weights. APPLE Load Testing Systems include a guide frame, a modular ram and a free release mechanism. A force transducer is typically placed on top of the foundation element to collect force measurements. Plywood is placed on top of the force transducer to cushion the impact. Velocity records are obtained from accelerometers attached near the top of the pile or shaft.



Benefits of Dynamic Load Testing with APPLE Systems

- Attractive alternative to static load testing
- Ram weights up to 80 tons available for dynamic load testing or rapid load testing
- Include a shaft or pile top force transducer to simplify force measurements
- Designed to activate a large range of test loads
- APPLE systems may be delivered to projects anywhere in the USA, Canada and Mexico

GRL Engineers, Inc.

Corporate Office
Ohio

Office Locations

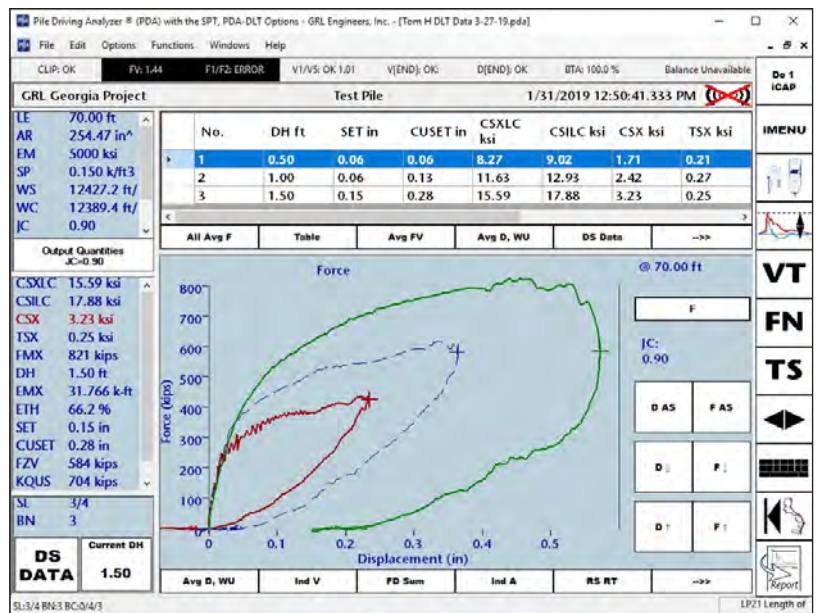
California	Georgia	Louisiana	Pennsylvania
Colorado	Hawaii	Massachusetts	Texas
Florida	Illinois	North Carolina	Washington



APPLE Dynamic Load Testing Systems

GRL Engineers can provide an APPLE Dynamic Load Testing System for a wide range foundation types and loads.

APPLE Systems	Modular Weights (ram)
APPLE I	7 - 10 tons
APPLE II	4 - 20 tons
APPLE III	7 - 15 tons
APPLE IV	4 - 40 tons
APPLE V	8 - 16 tons
APPLE VI	4.5 tons
APPLE VII	1 ton
APPLE VIII	4 - 80 tons
APPLE IX	4 - 24 tons



Dynamic Load Test Results of Drilled Shaft

APPLE Test Preparation

A contractor assembles the APPLE in a relatively short period of time, and can easily move it from one foundation to another. The APPLE guide frame not only facilitates a well-aligned ram impact, but also serves to support the ram weight prior to impact. In this way, the crane is not subjected to a sudden load release. The guide frame is positioned over the foundation and evenly supported on the ground.

Test Procedure

The ram is raised to the initial drop height selected by the GRL engineer. A hydraulic clamp first transfers the load to the frame and then releases it, causing a free ram fall. The ram impacts the top of the foundation. The applied force from the APPLE ram impacting the deep foundation element is determined from either a pile or shaft top force transducer or from strain gages bolted to the side of the deep foundation. The use of a force transducer often speeds up the testing process and generally provides more accurate force measurements. In a similar manner, the pile or shaft top velocity is determined from accelerometers bolted to the side of the deep foundation. GRL reviews the Dynamic Load Testing data as it is processed in real time with the Pile Driving Analyzer® (PDA). Based on the collected data, the test is repeated at additional drop heights.

Data Analysis and Reporting

Dynamic Load Testing data is further analyzed with the CAPWAP® software to determine the mobilized capacity and the predicted load-movement response of the deep foundation. The dynamic load test results are presented in a summary report prepared for the project.



ASTM Standard

Apple Load Testing Systems can be used for Dynamic Load Testing or Rapid Load Testing in general accordance with ASTM D4945 or ASTM D7383, respectively.

For additional information on Dynamic Load Testing with APPLE Systems or any other GRL Engineers service please contact info@GRLengineers.com or visit us at www.GRLengineers.com.

