MATANUSKA-SUSITNA BOROUGH ACTION MEMORANDUM **AM No. 20-116**

SUBJECT: Award of Proposal No. 20-107P, Design Point Mackenzie Rail Extension Bridge Repairs to Michael Baker International, for the contract amount of $323,303.00.

AGENDA OF: November 17, 2020

ASSEMBLY ACTION:
Approved under the Consent Agenda 11-17-20 BM

MANAGER RECOMMENDATION: Present to the assembly for consideration.

APPROVED BY GEORGE HAYS, ACTING BOROUGH MANAGER: George Hays

Route To:	Department/Individual	Initials	Remarks
	Purchasing Officer		10/08/2020
	Capital Projects Director	BJS for JB	10/08/2020
	Finance Director		
	Borough Attorney		
	Borough Clerk	BJA for SRM 11-9-20	

ATTACHMENT(S): Fiscal Note: Yes X No _____
Analysis Sheet (1p)
Scope of Services (40pp)

SUMMARY STATEMENT: On June 10, 2020, the Matanuska-Susitna Borough Purchasing Division issued a solicitation requesting Proposals from qualified firms for to perform various professional services as a result from the 2018 Cook Inlet Earthquake. These services include damage evaluation, repair designs and construction management assistance during repair construction for seven bridges along the corridor Port Mackenzie Rail Extension between W. Millers Reach Road and W. Bakers Farm Road. This is a DHS&EM/FEMA funded project through DR-4413/PW00137. See scope of services for more information.

Services/Goods purchased will support the Capital Projects Department in assembly district #5.

In response to the advertisement, three proposals were received. A proposal evaluation team made up of Borough Pre-Design & Engineering staff, Borough Emergency Services staff, Alaska Rail Road Staff and Alaska Industrial Development and Export

Authority staff evaluated the proposals and selected Michael Baker International as the most advantageous firm for the Borough.

The initial contract period of performance begins on upon contract execution and ends on July 31, 2021. The Capital Projects Department, Pre-Design & Engineering Division will be administering the contract.

In accordance with MSB 3.08.170(B), Administration requests authority to modify the resulting contract completion date by 30 days for unforeseen circumstances.

RECOMMENDATION OF ADMINISTRATION: Award of **PROPOSAL NO. 20-107P, DESIGN POINT MACKENZIE RAIL EXTENSION BRIDGE REPAIRS** to **MICHAEL BAKER INTERNATIONAL** for the contract amount of **THREE HUNDRED THOUSAND TWENTY THREE THOUSAND THREE HUNDRED THREE DOLLARS AND 00/100 CENTS ($323,303.00).**

MATANUSKA-SUSITNA BOROUGH
FISCAL NOTE

Agenda Date: November 17, 2020

SUBJECT: Award of Proposal No. 20-107P, Design Point Mackenzie Rail Extension Bridge Repairs to Michael Baker International, for the contract amount of $323,303.00.

ORIGINATOR: Purchasing

FISCAL ACTION (TO BE COMPLETED BY FINANCE)	FISCAL IMPACT (YES) NO
AMOUNT REQUESTED 323,303	FUNDING SOURCE State
FROM ACCOUNT # 445.000.000 4xx.xxx	PROJECT # 55027-4400-4409
TO ACCOUNT :	PROJECT #
VERIFIED BY:	CERTIFIED BY:
DATE: 10-16-2020	DATE:

EXPENDITURES/REVENUES: (Thousands of Dollars)

OPERATING	FY2021	FY2022	FY2023	FY2024	FY2025	FY2026
Personnel Services						
Travel						
Contractual						
Supplies						
Equipment						
Land/Structures						
Grants, Claims						
Miscellaneous						
TOTAL OPERATING						
CAPITAL	323.3					
REVENUE						

FUNDING: (Thousands of Dollars)

General Fund						
State/Federal Funds	323.3					
Other						
TOTAL	323.3					

POSITIONS:

Full-Time						
Part-Time						
Temporary						

ANALYSIS: (Attach a separate page if necessary)

PREPARED BY: _____ PHONE: _____

DEPARTMENT: _____ DATE: _____

APPROVED BY: _____ DATE: 10/16/2020

AM No. 20-116

20-107P Scoring Summary

	Total	Objectives and Services	Relevant Project Experience	Proposed Project Staff	Methods	Management
Supplier	**/ 100 pts**	**/ 23 pts**	**/ 23 pts**	**/ 19 pts**	**/ 18 pts**	**/ 17 pts**
Michael Baker International	78.82 pts	17.02 pts	18.86 pts	15.96 pts	14.4 pts	12.58 pts
HDR, Inc.	73.12 pts	16.1 pts	15.64 pts	14.44 pts	13.68 pts	13.26 pts
PND ENGINEERS INC	70.32 pts	15.18 pts	16.56 pts	14.06 pts	12.96 pts	11.56 pts

SCOPE OF SERVICES

20-107P, DESIGN POINT MACKENZIE RAIL EXTENSION BRIDGE REPAIRS

ARTICLE 1
INDEX

1.1 Index of Articles

Following is an index of the Articles included in this Statement of Services and the assigned Task Numbers for the Article Subjects.

Article	Task #	Subject
2		Exhibits
3		Codes, Regulations, Standards and Procedures
4		Administrative Requirements
5		Project Location and Description
6		Summary of Contract Services
10	1	Survey for Design
14	2	Bridge Repair Design
20	3	Plans, Specifications and Estimates
21	4	PS&E Interpretation During Bidding
22	5	Assistance during Construction

(NIC) is abbreviation for Not-In-Contract.

ARTICLE 2
EXHIBITS

2.1 Exhibits List

Following is a list of the Exhibits included in this document. The Exhibits follow the last Article in the Appendix.

Exhibits	Subject
1	FEMA Scope of Work, 2019 Inspection Pictures of Earthquake Damage
2	Sample Monthly Progress Report
3	Vicinity Map
4	Tentative Project Schedule
5	Port MacKenzie Rail Extension Bridge Plan Sheets & LiDAR Imagery of each Bridge Site

ARTICLE 3
CODES, REGULATIONS, STANDARDS AND PROCEDURES

3.1

All studies, reports and design services shall be performed in accordance with Federal Railroad Administration (FRA) Bridge Safety Standards, applicable state and federal codes, regulations and the latest version of the American Railway Engineering and Maintenance-of-Way Association (AREMA) Manual for Railway Engineering standards; professional practice procedures; and commonly recognized construction methods. The Contractor shall consider the geographical location of the project as well as other environmental and site specific constraints when performing services for this project.

3.2

Publications that contain the current railway standards and guidelines are available from the FRA and AREMA. If more details are required, consult the Alaska Railroad Corporation Project Management Department. During the period of this agreement documents described may be added to, deleted or revised.

3.3

English units of measurement shall be used throughout development of the project.

ARTICLE 4
ADMINISTRATIVE REQUIREMENTS

4.1 General

The Contractor shall provide services as identified and authorized by sequentially numbered Notices-to-Proceed. The Contractor shall not perform services or incur billable expense except as authorized by a Notice-To-Proceed (NTP).

4.2 Project Staff

All services must be performed by or under the direct supervision of the Capital Projects Pre-Design & Engineering Division (CPD PD&ED). The project staff assigned to this specific project shall be named at a later date.

4.3 Professional Registration

All reports, plans, specification, estimates and similar work products provided by the Contractor shall be prepared by or under the supervision of professional Structural Engineer currently licensed in Alaska.

4.4 Billing Reports

The Contractor shall provide a two-page (typical) report with each monthly billing for months in which services are performed. Billings will be submitted no later than the 15th of each month. The report shall follow the guidelines outlined in the Sample Monthly Progress Report, Exhibit 2. Any delayed costs from previous billing periods that are included in the current billing must be clearly explained in the report.

4.5 Correspondence

All correspondence prepared by the Contractor shall bear the Capital Projects assigned Project name, numbers, and be addressed to the MSB's Project Manager. All Contractor correspondence with government agencies or the public regarding the project will first be reviewed and approved through the MSB Project Manager.

4.6 Documents and Reports

Reports shall be printed with solid black letters that are double spaced on white, 8.5 inch x 11 inch bond or "Xerox Copy" paper. Other size paper may be used for illustrations if they are folded to 8.5 inch x 11 inch size. Original documents and reports shall be printed on one side of the paper only and shall be ready for copying. Original, scan ready, copies of final documents and reports shall be submitted to the CPD PD&ED for review before printing. All final document and report files shall also be submitted in the latest version of Microsoft Word and AutoCAD as appropriate on a portable flash/thumb drive. The Contractor shall use "active voice" verb forms when writing documents and reports where feasible. The project plans, specifications and estimate shall use Alaska Railroad Corporation format requirements.

4.6.1 Copies

When the Contract calls for multiple copies of documents or reports, the copies shall be printed on both sides of the paper. However, the cover and pages with approved illustrations, multicolored graphics, or photographs shall be printed on one side of the page only. All copies - except for originals - shall be comb bound.

4.6.2 Page Numbers

All documents shall be page numbered to allow every major Section, Chapter, Appendix, etc., to begin on a "right hand," odd numbered page.

4.6.3 Covers

The cover of all documents and reports shall include the following information:

a) Name of document or report.
b) Date.
c) Indicate whether draft or final.
d) Project Name.
e) Borough/State Project Numbers:
f) Prepared for the Matanuska-Susitna Borough
g) Prepared by:
h) Map and/or picture of project area.

4.7 Plans, Maps, and Plats

Plats shall be submitted with solid black ink on 22 inch x 34 inch original vellum or mylar -format. Final drawings shall be on 4-mil double mat mylar. All final drawings shall be plotted on the back surface so that the front surface of the mylar is inkable and erasable. No Kroy lettering or "sticky back" applications shall be used.

4.7.1 Drafting

All drawings and plot files shall also be submitted in the latest version of Adobe Acrobat (PDF format) and AutoCAD (DWG format) as appropriate on a portable flash/thumb drive. The current National CAD Standard layer scheme shall be used. Follow the drafting procedures as outlined in the current State of Alaska Department of Transportation & Public Facilities (ADOT&PF) Design Manual. Failure to adhere to this scheme shall be cause for rejection.

4.8 Specifications and Estimates

The Contractor shall provide specifications and estimates that correspond to the design documents and Statement of Probable Construction Cost based on the MSB Project Manager's approved and mutually agreed upon schedule and construction budget. Specifications and Estimates shall be submitted with solid black letters that are single spaced on white, 8.5 inch x 11 inch bond paper. Estimates shall be printed on one side of the paper only and shall be ready for copying. Specifications and estimates shall contain no graphics and no photographs except as specifically approved by the CPD PD&ED division.

4.8.1

Copies of the Specifications shall be printed on both sides of the paper and shall be bound with a comb binder. Copies of the estimates shall be single sided. For Reviews, copies of estimates shall be included as the first item behind the cover of the Specifications.

4.8.2

All Specifications shall also be submitted on USB Flash Drive as document files in the latest version of Microsoft Word software written for DELL compatible personal computers.

4.9 Proofreading

The Contractor shall prepare the report(s), which to the greatest extent possible, are free of mathematical, grammar, spelling and typographical errors. The Contractor is responsible for proofreading of the report(s) to meet the intent of this requirement.

4.10 Revisions

The Contractor shall modify work products in response to direction from the CPD PD&ED. Corrections, adjustments, or modifications necessitated by the review/approval process, but which do not substantially affect the scope, complexity, or character of the services, shall be considered a normal part of the Contractor's services.

4.10.1 Errors and Omissions

Except as described in this Statement of Services, work products shall be essentially complete when submitted to the CPD PD&ED. Work products having significant errors or omissions will not be accepted until such problems are corrected.

4.10.2 Review Meetings

Following each review the CPD PD&ED will provide written comments and may hold a meeting to discuss the issues. The Contractor's personnel who are in-responsible-charge for the work products under review shall attend the meeting and they may be asked to interpret and provide explanations of the content.

4.10.3 Comment Resolution

The Contractor shall provide a written response with subsequent submittals that address all written and oral comments from the CPD PD&ED. All changes from previous submittals shall be clearly explained.

4.11 Reproduction and Distribution

When the contract requires only the original or only one copy of a work product to be delivered, the CPD PD&ED will reproduce and distribute any other copies required. Items delivered for reproduction shall be organized and camera ready for copying and not stapled or otherwise bound.

4.12 Completion Documentation

The original of all documents prepared by the Contractor during project development shall be submitted with the Final Plans, Specifications and Estimate (PS&E) assembly. These documents include all notes, sketches, maps, photographs, survey data, computations (cost computations shall be under separate cover), cross sections, and other materials created to develop, record, or justify services provided for the project. These documents shall identify all assumptions made. The Contractor shall keep a copy of all the development documents until construction is complete.

4.12.1

Survey data shall be submitted both on paper and on electronically in accordance with articles 10.1.and/or 10.2.

4.12.2

Documents created to determine pay item quantities shall contain sufficient information to allow the quantity for each pay item to be checked by starting from the source document. These Documents shall be referenced to the applicable pay item.

4.12.3

Documents shall be submitted in loose leaf three ring binders. The binders shall be labeled on the spine with the project name, "Completion Documents", and the binder number. The front of the binders shall also be labeled with this information as well as the Borough project numbers and a brief description of what documents are contained in the binder. The binders shall have dividers that sort the contents by pay item number, report, or other logical category. The binders shall be numbered and the first binder shall include a table of contents. Services done on a computer shall be submitted on standard paper and on computer diskettes as detailed in Article 4.

4.12.4

It is expected that this information will be generated in order to develop the completed plans, specifications and estimate. Only minor reproduction costs for the Contractor's copy will be paid.

ARTICLE 5
PROJECT LOCATION AND DESCRIPTION

5.1 General

The Port MacKenzie Rail Extension (PMRE) is a 32-mile long Borough project that extends from the Alaska Railroad mainline near the City of Houston to Port MacKenzie. There are seven bridges along the corridor between W. Millers Reach Road and W. Bakers Farm Road damaged during the 2018 Earthquake. See Project Vicinity map Exhibit 3.

The consultant shall provide professional services to the Matanuska-Susitna Borough (MSB) for structural bridge damage evaluation, repair designs and construction management assistance during repair construction. Inspections and reports shall be completed prior to **August 14, 2020**; it is the desire to begin the inspections in late July 2020. Bridge design plans for repair/replacement will need to be completed prior to **November 1, 2020.**

The majority of the bridges will require access and transportation via land vehicle to the bridge sites and will need to be coordinated with the MSB CPD PD&ED. The bridge inspections must be completed by personnel with substantial experience in inspecting railway bridges of similar construction, have working knowledge of the 2019 AREMA Manual for Railway Engineering, and are properly certified for climbing access to conduct field inspections. The MSB does NOT have access to bucket or reach equipment to assist in inspection access.

The initial inspection/evaluation will yield a report that documents the condition of each bridge, including photographs of key areas, and shall provide a prioritized list of items that require repair or replacement as appropriate. A professional Structural Engineer licensed in the State of Alaska will be required to seal the report. Initial inspections shall be completed visually, utilizing hand-held tools where appropriate. In the event that conditions indicate additional material testing may be required, such additional analysis may be handled via change order where deemed appropriate.

Starting from the south, FEMA Bridge #4 AKA W Baker Farm Creek bridge access is off W Point Mackenzie Rd about MP 15.8. The bridge GPS location is N61.31081, W150.04736. Off road access only, vehicle access has been trenched off. FEMA Bridges # 5-7 are also accessible by travelling to W Point Mackenzie Rd MP 7.4 then turning right to W Ayrshire Avenue, travel west to the rail line crossing, then turn north onto the rail embankment. FEMA Bridge #5 is about 2.85 miles from Ayrshire Avenue. This creek crossing bridge GPS location is N61.46433, W150.10188. FEMA Bridge #6, the third bridge, is another 0.3 miles to the north. This bridge crosses an existing trail and GPS location is N61.46813, W150.09842. FEMA Bridge #7, the fourth bridge is north another 0.87 miles. This bridge is across another existing trail at GPS location N61.47918, W150.08728. The closest access to FEMA Bridges 1, 2 & 3 are from the Big Lake area off W Susitna Parkway to W Papoose Twin Rd. FEMA Bridge #1 is about 0.31 miles north on the rail alignment. This bridge crosses a drainage slough at GPS location N61.58723, W149.93384. FEMA Bridge #2 is about 2.02 miles further north. It crosses Hourglass Lake Creek at GPS location N61.54231, W150.04845. FEMA Bridge #3 is another 5.1 miles north or can be reached by travelling to W Millers Reach Road and travelling south about 4.04 miles. This bridge crosses West lake creek and Houston Loop trail at GPS location N61.51701, W150.07667.

The structural evaluation and design for repair shall follow the original plan intent with original plans available for reference (Exhibit 5). 2019 Aerial photography and 2011 topographic information through the Matanuska-Susitna Borough's LiDAR project is available for this project.

Approximately $2.1 million is available from FEMA for design and construction to bring the sites back to pre-disaster condition. Project development will follow Alaska Department of Transportation and Public Facilities (ADOT&PF) guidelines for federally funded projects.

ARTICLE 6
SUMMARY OF CONTRACT SERVICES

6.1 General.

The Contractor shall provide professional services for structural evaluation of each of the seven bridges, repair designs with estimates, engineering support for the development of bid-ready Plans, Specification and Cost Estimates (PS&E) as described herein. The aforementioned PS&E package shall first be developed to the Preliminary Engineering Level (35% complete) before the MSB shall decide which bridges or segments of the project area will go forward and be developed to the Final PS&E Level. MSB reserves the right to negotiate and add, by amendment, development of any bridges or segments of the project not developed in the Preliminary Engineering Plan Set (as mentioned above) to the Final PS&E level. However, MSB is not obligated to do so and may obtain these services by any other means including in-house forces.

Professional services activities include: Bridge damage investigation/evaluation by a Structural Engineer, preparation of design plans, Specifications & Estimates, design completion documentation, bidding support and construction management.

The scope of this contract includes any study or analysis required to complete the construction documents. The MSB reserves the right to add any Not in Contract (NIC) items during the design and construction of the project.

Additionally, the Borough has collected 2011 LiDAR topographic survey for the project area. This topography and associated 2019 aerial photography is currently available upon request through the Borough website at http://www.matsugov.us/it/2011-lidar-imagery-project. Additional topography will be required to field verify current conditions.

ARTICLE 10
SURVEYING FOR DESIGN
Task 1

The following articles are Included in this work:

- ARTICLE 10.1 GENERAL CRITERIA FOR SURVEYING AND MAPPING SERVICES
- ARTICLE 10.2 SURVEYING AND MAPPING SERVICES

ARTICLE 10.1
GENERAL CRITERIA FOR SURVEYING AND MAPPING SERVICES

10.1.1

The Contractor shall perform the services to standards called for in the Alaska State Professional Land Surveyors (ASPLS) Standards of Practice, the California Geodetic Control Committee (CGCC) Standards for Band IV surveys, U.S. COE Manual EM-1110-1-10000 for Photogrammetric Mapping, FEMA Guidelines & Specifications for Flood Hazard Mapping, or the ADOT&PF Construction Surveying Requirements, as appropriate to the services being performed. California Geodetic Control Committee Standards can be found on the Web at: http://www.rbf.com/cgcc/. FEMA Guidelines & Specifications for Flood Hazard Mapping can be found at: http://www.fema.gov/plan/prevent/fhm/index.shtm. U.S. COE Manual EM-1110-1-10000 can be found on the Web at: http://www.usace.army.mil/usace-docs/eng-manuals/em1110-1-1000/toc.htm. Deviation from these standards must be approved by the CPD PD&ED and will not be considered without a contractor-provided plan to assure that quality will be maintained.

All studies, reports and services shall be performed in accordance with applicable codes, regulations and standards; professional practice procedures; and commonly recognized surveying and mapping methods. All documents including reports, computer printouts, half size Survey Control Diagrams or Sheets shall be bound and indexed in a three-ring binder, with the job name listed on the spine and cover. No loose-leaf papers will be accepted. The Contractor shall not begin surveying for design, surveying for right-of way, or right-of-way mapping without specific written authorization from the CPD PD&ED.

10.1.2 Location Considerations

The Contractor shall consider the geographical location of the project as well as other environmental and site specific constraints when performing services for this project.

10.1.3 Registration

All survey services shall be conducted by, or under, the supervision of a Professional Land Surveyor (PLS) holding current registration in the State of Alaska. A Land Surveyor shall also be involved in the preparation of the Base Maps, Right-of-Way Maps, and Parcel Plats. The field books, horizontal and vertical control summaries, survey control diagram, adjusted coordinates, survey control sheet(s), final centerline control, and all final maps and plats shall be sealed, signed, and certified by the PLS responsible for the accuracy and completeness of the services. The Contractor will provide a QC plan to certify the surface.

10.1.4 Field books

The Contractor shall furnish hardbound field books for recording survey information. The books shall become the property of the CPD PD&ED after the survey information has been entered and the contract completed. Each book shall be labeled with the project name and an appropriate title, e.g. Horizontal Control, Vertical Control, etc., and shall have an index and comments page. The index page shall reference the contents by page number. A readable PDF copy of the field books is acceptable.

10.1.4.1 Field Notes

Field notes shall be kept in a neat and orderly fashion. All pages shall be consecutively numbered, showing date, weather, and crew names. All abbreviations used shall be described on the comments page. Sketches are to be used frequently and shall be detailed enough to assist in following the progression of the services. Notes and sketches shall be adequately detailed to convey their intent to a person who is not familiar with the project.

10.1.4.2 Descriptions

Descriptions of all monuments or other points, recovered or set, are to include the data stamped on the monument and the condition of the monument. Two digital photos are required of each point found or set. The first is a close up of the cap, and the second is a general location picture, with some sort of reference like a stake or tripod over the point. Name the photo electronically according to the Department point numbering scheme, or by an identifier that is on the cap. Example: GPS point "FRED" would be FRED.jpg or 551.jpg, if that were its number on the Survey Control Diagram. A list of all corners searched for, but not recovered shall be included in the field notes. The ADOT&PF Construction Surveying Requirements details the general note-keeping procedures.

10.1.5

U.S. Customary System of Measurement (foot units) shall be used throughout development of the project. Any metric conversions required shall be based upon the U.S. Survey Foot (3937 feet = 1200 meters exact).

10.1.6 Drawings, Plats, and Maps

Drawings, Plats, and Maps shall be prepared in electronic format as approved by the CPD PD&ED (currently AutoCAD Civil 3D 2011).

10.1.6.1

Unless otherwise stated, the format and standards for all drawings will be according to the most current DOT/PF Central Region Design Drafting Manual. These standards are available upon request or via the Right-of-Way Engineering FTP site. The plotted scale shall be as specified by the CPD PD&ED.

10.1.6.2

Drawings shall be produced and provided in English (U.S. Survey foot units) format. Distances will be shown in horizontal ground foot units. Areas shall be annotated with "Ac." for acres, and "sq. ft." for square feet. Metric units shall not be shown on drawings developed for design work, unless requested to do so by the CPD PD&ED.

10.1.6.3

All linework and lettering must be of professional quality and all line widths and lettering sizes must be of such size that all information can be clearly shown without overlap or confusion. All lettering must be a minimum size of 0.1 inch at a full-scale plot. Lettering and linework must be in the appropriate black drafting ink. AutoCAD style names and fonts shall follow the Capital Projects specified standards. See the current Design Drafting Manual (10.1.6.1)

10.1.6.4

Linework shall not run through text. Do not break lines at text; mask the linework. If solids are used for masking they shall be placed on the same layer as the text that the solid lies under.

10.1.6.5

Drawings are to be accurate models of the data shown, e.g.; a line labeled N 10°00'00" E 104.35' shall be electronically drawn exactly as labeled, a line that is shown to terminate at a monument

symbol shall be electronically drawn with no distance between the endpoint of the line and the center of the symbol, etc.

10.1.6.6 CAD Drawing

All work within Model Space shall be color by layer. The drawing shall be purged before submitting. Zoom to extents and remove any extraneous features. Remove all empty layers. Check to ensure that all symbols are the same scale, which should be the plotted scale of the drawing. A standard north arrow, a legend depicting symbols used, a foot unit bar scale, the drawing file name, date of last edit, and standard border will be included on each sheet within the drawing.

10.1.6.7

Plans, Maps, and Plats shall be submitted electronically and with solid black ink on 22" x 34" original vellum or mylar. Final drawings shall be on mylar unless another medium is specifically called for in the Contract. All final drawings shall be plotted so that the ink is on the front surface of the Mylar. No Kroy lettering or "sticky back" applications shall be used.

10.1.6.8 Drawing Standards

Drawings not meeting these standards will be rejected. All drawing files shall be submitted electronically to the CPD PD&ED upon completion for review. The contractor shall perform their own internal review of these products before delivery, to see that CPD PD&ED standards have been followed.

10.1.7 Surfaces (TINs)

The format for Surfaces in AutoCAD Civil 3d format with fault lines as 3D polylines and the boundary as a polyline shall be elevation zero. An AutoCAD drawing or .xml file with the Surface as 3-D faces is an acceptable alternative; include the Surface boundary as a closed polyline at elevation zero, and the fault lines as 3D polylines. All TINs produced shall be checked by ground based survey methods and by field inspection of contours generated by the TIN. A TIN certificate shall be submitted, signed, and sealed by the responsible PLS and shall contain the following:

a) the methods used to gather data for production of the Surface(s),
b) the accuracy of the Surface(s), and
c) the checks used to substantiate the accuracy of the Surface(s). All ground based Surface(s) shall be field checked before final submittal, and this shall be stated on the Surface(s) certificate.

All photogrammetric and LIDAR surfaces shall be checked by a Registered Land Surveyor, not associated with the production of the Surface(s), using withheld Topographic points randomly collected throughout the Surface(s) area. A minimum of 50 points shall be collected. Provide a spreadsheet showing the elevation differences from the Surface(s).

10.1.8 Coordinate Files

Coordinate Files shall be comma-delimited ASCII text files. Data shall be in the sequence Point Number, N, E, Z, and Description. Coordinates shall be given to eight decimals for the Northings and Eastings, and three decimals for elevations. Points of unknown elevation shall have a placeholder of -9999 in the Z position. Descriptors are to be case sensitive, e.g.: Rebar5 shall not equal REBAR5. See surveying for Right of Way B10.2.3 for property corner descriptors.

10.1.8.1 Point Numbering Scheme

The following point numbering scheme shall be used:

Range	Use
1-100.	Primary Control Set (main project traverses)
101-300	Baseline Control (set PIs, PTs, etc.)
301-400	Aerial Control Panels or Naturals (HV's)
401-550	Secondary Control Points
551-600	Recovered Published Hz. Control (NGS, GPS, etc.)
601-700	Set or Recovered Vertical Control
701-2000	Find Monuments/Prop Corners
2,001-5,000	Computed/Protracted Points
5,001-20,000	Topography Survey Points
20,001-	Reserved for use by the Department

The Surveyor shall ensure that point numbers used in this task do not conflict with point numbers used in other survey tasks on this project.

10.1.9 Electronic Data

Drawing files, coordinate files, reports, etc. shall be submitted on CD ROM.

10.1.10 Quality Control

Quality Control shall be performed by the Contractor prior to all submittals. Three dimensional backsight checks shall be recorded at the beginning and end of all instrument setups. Three dimensional coordinate checks shall be recorded at the beginning and end of an RTK GPS work session, for those who are approved to use this technique (see 10.2.2.1.3). These checks shall become part of the submittal, labeled as "Quality Control Checks". The CPD PD&ED will reject submittals that do not substantially conform to the requirements of this statement of services.

10.1.11 Reviews

Draft documents required under this agreement shall be submitted to the CPD PD&ED Project Manager for review. The Contractor shall allow three weeks for the return of written comments. The Contractor shall address these comments to the satisfaction of the CPD PD&ED prior to submitting the final documents. For maps and drawings, the Contractor shall submit a copy of the project coordinate file with point descriptors and the AutoCAD drawing file along with the final survey point plot.

10.1.12 Submittal Delivery

Deliverables shall be submitted to the CPD PD&ED in accordance with the negotiated schedule.

ARTICLE 10.2
SURVEYING AND MAPPING SERVICES

10.2.1 OVERVIEW

B10.2.1.1 General

The Contractor shall research records of surveys applicable to the requirements of the assigned project and perform all necessary field and office survey services necessary to collect surveying data and to reduce the collected data to a form useful engineering design and right-of-way mapping.

10.2.1.2 Scope

1. Survey Limits: Perform a Design Survey for the selected bridge, 100 feet left and right of the center of the bridge to include abutment slopes and creek ordinary high water elevations. Perform Right-of-Way Survey for the entire length of the bridge including 100 feet of bridge approach embankment on both ends of the bridge to establish construction zone boundaries.

2. In areas requiring surveying for design, the CPD PD&ED requires design level topographic mapping, and a Surface (TIN).

3. Horizontal control shall be the Alaska Department of Transportation, Central Region's coordinate system which covers the project, with state plane bearings and ground distances, in U.S. Survey feet.

4. Vertical control shall be based on the nearest published NGS or CPD PD&ED approved bench marks. A prove out loop at the beginning of the project shall be required using conventional leveling techniques exceeding the standards for third order leveling as specified in the latest printing of the Federal Geodetic Control Committee's Standards and Specifications for Geodetic Control Networks. The Department requires a BM every mile within the project and a TBM every ½ mile. Refer to section 3.2.1.6 of the current Statement of Services.

5. A planimetric and topographic field survey including underground utility locates meeting the requirements of section 3.2.3 excluding subsection 3.2.3.6, which includes a TIN that accurately depicts one-foot contours, shall be submitted to the Department.

10.2.1.3 Survey Services

Services shall be performed in the following sequence unless otherwise directed by the CPD PD&ED:

1. Research
2. Pre-Work Meeting with Borough staff
3. Control Survey
4. Aerial Photography/Photogrammetry (NIC)
5. Topographic/Planimetric Survey
6. Bridge Site(s) Survey
7. Special Features (NIC)

8. Right-of-Way Survey (NIC)

9. Right-of-Way Mapping (NIC)

10. Monument Centerline (NIC)

10.2.2 SURVEYING FOR DESIGN

10.2.2.1 Control Surveys

Control surveys shall include establishing horizontal and vertical control points from existing monuments, from survey control points previously established, and/or from points newly established by the Contractor and also includes locating and establishing project coordinates for the existing centerline and any monuments within the project survey limits. The Contractor shall prepare a Survey Control Diagram (SCD) in AutoCAD format showing the results of the control surveys. The Survey Control Diagram will be a recorded document, and as such, will need to meet certain criteria. Prior to submitting any data for design, the Survey Control Diagram shall be submitted, along with supporting documentation, for review and approval. All points used or tied as a part of these control surveys shall be included in the project coordinate file and shown on the SCD. A sample SCD will be provided by the Department. Prior to performing field surveys for the project, the Contractor shall meet with the Department's Project Manager, or his designee, to get existing Department control data and to discuss the control requirements for the project.

A. 10.2.2.1.1 Basis of Horizontal Control

The basis of control shall be the NAD83 (CORS--Current NGS OPUS EPOCH) system and the primary control points to be used shall be decided in discussion with the CPD PD&ED. The NGS OPUS utility shall be used to establish the control coordinates, unless another method has been discussed with the CPD PD&ED. Refer to B10.2.2.1.5 for additional information. If an existing ADOT coordinate system does not cover the project area, the contractor shall design a similar state plane bearing ground distance system appropriate for the project and submit it for approval by the CPD PD&ED.

B. 10.2.2.1.2 Basis of Vertical Control

The vertical datum shall be NAVD 88, as determined by survey ties to existing vertical control points, or in areas with no official control, the contractor will present a vertical control plan for discussion and approval with the Department, such as Geoid-derived elevations.

C. 10.2.2.1.3 Horizontal Control Standards

All horizontal control survey measurements shall be recorded in field books. The books shall also be used to record all measurements and references to control points found or set, section monuments, centerline monuments, and all found property corners. Electronic data collection can be used to record control data, but is not acceptable as the sole data source for non-GPS survey measurements as this data needs to be recorded in field books for control surveys. The contractor can request an exception to this requirement, based on adequate documentation of individual angles collected and closures.

Auxiliary control points and/or monuments may be side-tied, providing that (a) the point is tied from two closed out traverse points, or tied with two different backsight points (that are closed traverse points) or (b) The point is tied from one traverse point with only one backsight provided there is a three-dimensional backsight check recorded in the field book. When there is more than one value, the raw coordinate values for these side ties (calculated from the adjusted traverse coordinates) shall be within 0.10 feet. The final coordinate values for side tied points shall be the mean of the two raw coordinate values or proportionally weighted based on the strength of the observations. Auxiliary control points shall be, at minimum, a PK nail (mag nail preferred) in paved areas or a 6-inch spike in unpaved areas.

All traverses performed for this project shall meet or exceed the standards for Third Order Class I, Traverse Surveys as specified in the Alaska Society of Professional Land Surveyor's Standards of Practice. All traverses shall be closed; beginning and ending at known points with an allowable linear error of closure of 1:5,000 or better. In no case shall ground traverses run greater than 2 miles between GPS controlled points. Static GPS work shall meet current California Geodetic Control Committee (CGCC) Standards for Band IV Surveys or comply with a Department approved observation and adjustment plan. All geodetic positions shall be NAD83 based. Traverse and GPS network adjustments shall be by Simultaneous Least Squares Adjustment methods.

The preferred method to tie all cadastral, property, or right-of-way corners controlled with GPS is Static GPS survey methods. These corners are to be considered secondary control and need only to be occupied once, providing there is a minimum of two vectors computed for the corner position that differ by no more than .10 feet horizontally.

The use of Post-Processed Kinematic (PPK) GPS procedures are not allowed for establishing control, or for controlling cadastral, property, or right of way corners. Real-Time-Kinematic (RTK) surveying techniques can be used for control and property ties with a contractor-provided observation and quality control plan including observing every point twice with more than 20 minutes separating observations, and a plan to check and document that the two shots do not differ by more than .10 feet or less in separation.

D. 10.2.2.1.4 Vertical Control Standards

All vertical control survey measurements shall be recorded in field books, unless an electronic digital level is used and the data is recorded electronically, in which case the Contractor shall provide annotated copies of the raw and reduced data. All vertical survey circuits shall meet or exceed the standards for third order leveling as specified in the latest printing of the Federal Geodetic Control Committee's Standards and Specifications for Geodetic Control Networks. All vertical control points shall be part of a closed level loop; side-shots are not acceptable. Each loop shall be adjusted and this adjusted elevation used for any further loops.

Loop closures and loop-adjusted elevations shall be shown in the field books. The books shall also be used to record descriptions and sketches of vertical control points found or set, condition of found points, and for electronically recorded data the loop information (start point, point(s) controlled, end point, etc.) necessary to interpret the data. Primary vertical control points (BMs and TBM's) shall be controlled by differential leveling. Elevations may be established for auxiliary control points by closed trigonometric loops, in which case sight distances shall not exceed 750 feet with foresights and backsights of approximately equal lengths, and the line of sight shall clear obstacles by a minimum of 1.5 feet to avoid the effects of adverse refraction. Elevation differences shall be measured and recorded to the nearest 0.01 foot.

E. 10.2.2.1.5 Primary Horizontal Control

For traverses along road corridors, GPS control points shall be set at a minimum of three control points within the project corridor or at a maximum of 2 mile intervals within the project limits, in areas where they may be easily traversed in and out of.

These points shall be used for both the project horizontal and vertical control. A 9/16" stainless steel or 3/4" Aluminum rod shall be used for these monuments. A minimum 4 inch pipe of length 2.5 feet shall be set around each monument with a protective cap and a carsonite marker post. These rods shall be driven to a minimum of 72 inches or refusal, whichever is less. An acceptable alternative would be to cement a cap into a solid rock outcropping or bedrock.

Additional intervisible traverse points, as needed, shall be set at maximum 2,640 foot intervals, and shall consist of a minimum 5/8 inch x 30 inch rebar (5/8 inch x 10 inch in pavement) with identifying cap. These points shall be located off of the existing paved surface wherever possible, and shall be set at least 0.1 foot below the existing ground surface.

All GPS control points shall be referenced by two secondary monuments or by one secondary monument with a defined backsight, set in-line and roughly perpendicular to the direction of travel, and set in such a manner that they may be expected to last through construction of the project. The reference data shall be recorded in field books, with sketches showing the area in the vicinity of the point in detail, reference distances recorded to the nearest 0.01 foot (nearest foot for the defined backsight), and an angle turned from the traverse line to the reference line. All primary horizontal control points and reference points, found or set, shall be shown on the SCD.

The Contractor shall prepare a narrative horizontal control summary detailing the datum, primary control points used, Basis of Bearings, type of adjustment performed and statistics, problems encountered during the survey, equipment used, etc., which shall include annotated copies of control computations and control adjustments, and a horizontal control statement.

For GPS control surveys, the Contractor shall also provide a RINEX format data file of at least 8 hours of GPS data for at least two control points in the Contractor's control network. The CPD PD&ED recommends logging as much data on as many different days as possible to account for any solar disturbances or other unanticipated problems that might occur.

These GPS files for the rod control points shall be sent to the NGS site and post-processed using the OPUS utility. The OPUS reports shall become part of the horizontal and vertical control summary. A mean horizontal and vertical value for the point with the smallest differences shall be computed and held as control for the network. The other OPUS point shall be used as a check.

If no published NAVD 88 elevation is available within the project area, the most current Geoid model that is available for Alaska shall be used to compute a pseudo NAVD 88 elevation for the held point. Differential levels shall be run from the held control point to the other two so that a good relative vertical network exists between the three points.

F. 10.2.2.1.6 Primary Vertical Control

For Projects along road corridors, primary vertical control points shall be established every 1/2 mile or less. Existing official bench marks (BMs) shall be used wherever possible, with intermediate temporary bench marks (TBM's) established between them. These TBM's shall be stable objects such as luminaries' and signal pole base bolts, spikes in trees, etc. Wooden utility poles and traverse points shall not be used for TBM's. Where no permanent official bench marks exist, the Contractor shall establish a minimum of two permanent bench marks per project site, or one per mile, whichever is the greater number, for use through project construction. Permanent bench marks shall be at a minimum, 9/16 inch stainless steel rod or ¾" aluminum rod driven 40 inches or until refusal into dry ground, encased by a 2.5 foot section of 4 inch pipe buried 3 feet into the ground with a rubber cap covering the top of the pipe, or a brass cap cemented into rock outcrops or stable concrete structures, e.g. bridge abutments or building foundations and walls.

These points may also satisfy the requirements for Horizontal control, under section B10.2.2.1.5. A carsonite marker post shall be placed near each permanent benchmark, found or set. Refer to the NOAA Manual NOS NGS 1, Geodetic Bench Marks for recommended guidelines for setting permanent benchmarks.

Primary vertical control points, found or set shall be described in great detail, identifying the particular physical feature used for the elevation point, and sketches shall be made to aid in this effort. Instructions sufficient to enable someone unfamiliar with the project to find these points shall be recorded; these instructions shall include distances and directions from recognizable terrain features such as major intersections, bridges, buildings, etc. All primary vertical control points, found or set shall be tied to the project horizontal control and shown on the SCD.

The Contractor shall prepare and provide a narrative vertical control summary detailing the datum, primary control points used, vertical network adjustment data, problems encountered during the survey, equipment used, etc., which shall include a benchmark data sheet containing the name, description, final adjusted elevation, and instructions for finding each primary vertical control point, and a vertical control statement.

G. 10.2.2.1.7 Monument Ties

The Contractor shall locate and verify all monuments within the existing Right-of-Way limits and the proposed construction limits. This will insure that the CPD PD&ED can comply with the provisions of AS 19.10.160 and AS 34.65.040, and enable an estimate of quantities to be made. Examples would be Rectangular or Centerline monuments. In the event there is no Right-of-Way survey performed, these corners will need to be surveyed using the methodology described in section 10.2.2.1.3, so their position can be accurately reestablished. These corners are to be included on the SCD, if there is no surveying for right-of-way or on the Record of Survey if there is surveying for Right-of-Way. Other types of monumentation, such as federal control points, shall be surveyed and shown.

10.2.2.3 Topographic Survey

Topographic features shall be surveyed using appropriate data collection methods. The Contractor shall provide complete topographic mapping in a single AutoCAD drawing file along with a single TIN upon completion. All points located in these surveys shall be included in the project coordinate file. The use of Post-Processed Kinematic (PPK) or Real-Time-Kinematic (RTK) GPS procedures are only allowed for topography if the Contractor submits an observation plan for quality control to the Department's, or it's designee, and such plan is approved by the CPD PD&ED for use on this project. The Contractor shall:

A. 10.2.2.3.1

Define the existing ground surface by creating a surface, or Triangular Irregular Network (TIN). The TIN shall be capable of accurately generating one foot contours in all areas. Hard shots (pavement, concrete, etc.) shall have vertical accuracy of less than 0.1 foot. The TIN shall incorporate fault lines (grade breaks, existing centerlines, edges of pavement, curbs [flowline and top back], sidewalks, shoulders and/or tops of bank, toes of slope/fill, ditches and/or drainages, etc.) and additional shots as necessary to insure that the TIN accurately represents the existing ground surface. The TIN shall not represent water surfaces. Sufficient data shall be gathered along driveways and side streets to allow grade matching. Provide TIN verification in the form of the CPD PD&ED TIN Certificate. (10.1.7)

B. 10.2.2.3.2 Road Projects (NIC)

Locate and map all existing improvements and utilities (above and below ground) within the survey limits. Mapping of overhead utility wires shall include the apparent low point of the wire sag. Overhead wire crossings shall also be located at the existing and proposed centerlines. Elevations for these points shall be the bottom wire elevation.

C. 10.2.2.3.3 Drainage Structures

Locate and map all drainage structures within the survey limits. Record diameters, lengths, invert elevations, structure type and condition, high water marks, and apparent flow direction.

D. 10.2.2.3.4

Locate and map any other physical feature, natural or man-made, that could affect the design of the project, as directed by the CPD PD&ED.

E. 10.2.2.3.5

After the CPD PD&ED has reviewed the provided data, the Contractor may need to extend the TIN & topographic mapping as specified by the CPD PD&ED for those areas where construction will be beyond the TIN generated earlier.

F. 10.2.2.3.6

Locate and tie, both horizontally and vertically proposed and existing geotechnical sample locations. The Contractor shall stake the baseline or sample locations as directed by the CPD PD&ED.

10.2.2.4 Bridge Site Survey

The Contractor shall perform drainage surveys in the vicinity of proposed channel crossings or major drainages. All work shall be tied to project horizontal and vertical control. Surveys shall be performed as specified in the Preconstruction Manual unless otherwise directed by the CPD PD&ED. The Contractor shall coordinate with the CPD PD&ED for site-specific requirements. The data collected for these surveys shall be incorporated into the TIN and topographic files, and all shots taken shall be included in the project coordinate file.

For culverts 36 inches and over in diameter, 4 cross sections upstream and 4 cross sections downstream from the inlet and outlet of said culvert shall be surveyed. The spacing of these cross sections shall be equal to the average width of the existing streambed (i.e. 10 feet wide will then have cross sections taken at 10, 20, 30, and 40 feet upstream and downstream). Cross sections shall be taken perpendicular

to the existing streambed. Shots shall be taken at: the thaw leg, the toe of slope, the edge of existing water, ordinary high water, the top of bank, and one shot past the top of bank. The data collected for these surveys shall be incorporated into the TIN, topographic, and project coordinate files. The Contractor shall perform the following drainage survey work:

A. 10.2.2.4.1 (ALL READY PROVIDED OLD DESIGN)
For bridge sites, the line of ordinary high water shall be located. The Contractor shall search for evidence of extreme high water and locate it at the existing structure. These items shall be located both horizontally and vertically.

B. 10.2.2.4.2

Prepare a topographic map of each bridge site at [typically 1 foot] contours. Scale shall be at least at [typically 1"=100'], unless otherwise directed by the CPD PD&ED. The map shall show the ordinary high water elevation (or mean high water in tidally influenced areas) and indicate the edge of water at the time of the survey. All buildings, dikes, rock outcroppings and other physical features shall be noted on the map.

C. 10.2.2.4.3 (NIC)

Additional data collection for the Hydraulic Report may be required after the design has reached the Local Review stage.

D. 10.2.2.4.4 (NIC)

Prepare a Bridge Site Report, which is a summary in ASCII format noting pertinent information such as horizontal and vertical control basis, date of survey, bridge number, name of water body, ordinary high water coordinate point numbers, extreme high water high water coordinate point numbers, existing structure coordinate point numbers, and note whether body of water is navigable.

10.2.2.5 Special Features

The Contractor shall collect ground elevation data necessary and stake the location of project specific appurtenances to the roadway (retaining walls, breakwaters, special ditches, turnouts, sound barriers, etc.) as necessary for their design and field review by the CPD PD&ED.

10.2.2.6 Deliverable Items

The deliverables shall be organized on a flash/thumb drive in folders according to the following list. Only submit what is required for your specific project. Do not submit extra information not required by the CPD PD&ED. Name the files and folders according to what they represent. Do not use contractor specific job numbers. CAD drawings should be named in such a manner that anyone can tell what it represents without having to open the drawing. An example would be PMRE Bridge #4_Topo.dwg, and not 06-342.dwg.

1. Field Books (if a PDF is submitted)

2. Point Files:

   All Points (local system).txt
   Descriptor List

3. Control Summary:
   H&V Summary.txt
   Traverse Adjustments
   Level Adjustments
   GPS Adjustments

4. SCD

5. SCS (NIC)

6. GPS Data

7. Electronic Photographs

8. Surface (TIN):
   TIN Cert
   QC Spreadsheet if Aerial

9. Bridge Site Survey
   River Name
   Bridge Site Form

10. Road name or Airport (NIC)
    Topo Drawing
    SCD Drawing

11. Photogrammetry Report

12. Ortho Photos

All paper submittals shall be bound and tabbed in a three ring binder, with a label on the spine. The Contractor shall submit the following items related to their Survey to the CPD PD&ED Project Manager:

	Deliverable Description	Required
A.	The original field books or PDF indexed, reduced, stamped and checked. (10.1.4)	√
B.	An ASCII coordinate file containing all recovered, computed, and topographic points in the local system (if provided). Electronic and hard copy printout (doubled sided) shall be submitted. Elevations that are not valid TIN elevations shall be coded as such in the descriptor. (10.1.8)	√
C.	An ASCII file listing all descriptors used and an expanded description of their meanings. Descriptors not used on this project shall not be included in this list. This file shall be submitted with the draft coordinate file. (10.1.8)	√
D.	Horizontal and vertical control summaries in ASCII format. The Contractor shall also provide annotated copies of control computations and control adjustments. (10.2.2.1.5 & 10.2.2.1.6)	√
E.	Survey Control Diagram. Obtain the Survey Control Diagram Standards from the Department. (10.2.2.1)	√
F.	Survey Control Sheet(s) Obtain the Survey Control Sheet Standards from the Department. (10.2.2.1.8) [NIC]	
G.	For GPS control surveys, the Contractor shall also provide RINEX GPS data files of 8 hours length for at least 2 control points, along with the OPUS reports. (10.2.2.1.5)	√
H.	Electronic Photographs - A folder with all of the Control and right-of-way points (10.1.4.2).	√
I.	All TIN files with a sealed and signed certificate of accuracy. All Quality Control Check points showing the differences from the true values (10.1.7). Obtain a sample TIN certificate from the Department. (10.2.2.3.1)	
J.	Bridge Site Survey mapping - (electronic drawing files and TIN files) (10.2.2.4)	√
K.	Bridge Site Report. A summary in ASCII format noting pertinent information such as horizontal and vertical control basis, date of survey, bridge number, name of water body, ordinary high water coordinate point numbers, extreme high water high water coordinate point numbers, existing structure coordinate point numbers, and note whether body of water is navigable. Refer to the CPD PD&ED for possible additional information. (10.2.2.4.4)	
L.	A complete and edited AutoCAD drawing file of the entire survey limits, containing topographic mapping (10.2.2.3)	√
M.	One set of edited and titled aerial photography contact prints acquired for the project shall be delivered along with a photography index map plotted at a scale of 1"=1mile on a sheet no larger than 24"x36". (10.2.2.2)	√
	A report of the photogrammetric control shall be provided including all ground control points, aerial photography camera logs, airborne GPS control procedures and results, analytical aero triangulation results, current camera calibration reports, and other data associated with control of the aerial photography. (10.2.2.2)	√
	Ortho Photo Mosaic in .tif format shall be delivered in files less than 80MB in size. A compressed image file such as Mr. Sid format shall also be included. Image resolution shall be such that the ground pixel size is appropriate for the terrain being photographed. An 8-1/2" x 11" index sheet showing the project area and the areas covered by the individual files shall be included. Two sets of color ortho-rectified photos are required to be submitted. (10.2.2.2.1)	√

10.2.3 SURVEYING FOR RIGHT-OF-WAY

10.2.3.1 Right-of-Way Boundary Survey (NIC)

The Contractor shall perform the following services to Third Order, Class I standards, as specified by the ASPLS Standards of Practice, with an allowable error of closure of 1:5,000 or better. The use of Post-Processed Kinematic (PPK) GPS procedures are not allowed for surveying Right-of-Way or any other monumentation. Real-Time-Kinematic (RTK) surveying techniques can be used for control and property ties with a contractor-provided observation and quality control plan including observing every point twice with more than 20 minutes separating observations, and a plan to check and report that the two shots do not differ by more than .10 feet in separation.

Typically the surveying for right-of-way is performed after horizontal control is established for the project, and the control information has been submitted to the Department for review and approval. One exception here is if the project is located in a remote location that dictates only one mobilization of the survey team due to logistical concerns and/or economics. These exceptions shall be discussed at the project pre-work meeting.

A. 10.2.3.1.1

Prior to commencement of the survey, the Contractor shall review any title documents and mapping in the Capital Projects possession which the Contractor considers relevant to the project. The Contractor shall be responsible for researching additional relevant documentation from other sources.

These documents may include but are not limited to the following: Bureau of Land Management (BLM) and Department of Natural Resources (DNR) land status plats, BLM township survey plats, Mineral and U.S. Survey plats and field notes, any records of survey, subdivisions, and relevant engineering control surveys, United States Coast and Geodetic Survey (USC&GS)/ National Geodetic Survey (NGS) control diagrams-descriptions, ADOT&PF right-of-way records and other easement or boundary documents of record, ADOT&PF engineering as builts, DNR surveys, and aerial photos.

One legible PDF copy on a CD of all of the above referenced reports, plats, notes and other source materials shall be submitted to the CPD PD&ED.

B. 10.2.3.1.2

Tie the nearest Public Land Survey System (PLSS) monuments (Section, 1/4 Section and 1/16 Section Corners) left and right of the project Right-of-Way corridor or if existing monuments that represent the legal corner positions don't exist at those locations, sufficient additional rectangular monuments and/or accessories to control the computations of the legal locations of those corners per the BLM 2009 Manual of Surveying Instructions for Public Lands. Any corner monument in need of rehabilitation or re-monumentation shall have rehabilitation accomplished prior to tying the monument location. The intent of the PLSS monument ties is to define the larger remaining parcel surrounding the existing road Right-of-Way.

Tie all existing centerline monumentation throughout the project limits including two centerline monuments at each end that extend beyond the limits of the project. Additional PLSS monuments shall be recovered to allow section breakdown for property boundary determination as directed by the CPD PD&ED. Tie adequate centerline monumentation on side streets to determine side street alignment to the project limits. A minimum of two side street centerline monuments shall be tied. If side street

centerline monuments are not recovered, the Contractor shall tie a sufficient number block or lot corners to define the side streets.

C. 10.2.3.1.3

All research for property corner ties (generally includes local platting authority subdivision plats and right-of-way plats, BLM U.S. Surveys, state land survey plats, waiver documents, deeds, record of surveys and monument records) should be done prior to commencement of searching and tying property and rights-of-way controlling corners. For the initial surveys all property corners within and along the existing rights-of-way and the rights-of-way centerlines should be searched for, documented and tied. In most cases, there will be some non-fronting property corners also required to be tied to setup subdivision blocks, survey boundaries and side-street rights-of-way. Sufficient control is required to establish the location of all surveys adjoining the ROW, or where acquisitions are planned. The extent of the corners to be tied normally is discussed and clarified during contract negotiations or at the survey pre-work meeting.

D. 10.2.3.1.4

Projects with PLO rights-of-way or other rights-of-way dependent on the physical road location (such as prescriptive claims), tangent as builts are required. This procedure normally requires the field determination of pavement or unpaved surfaces centerline by physical measurement, and then location of those points. Points are normally surveyed near each tangent end and a minimum of 3 points on curves The number of shots actually required depends on curve length and degree of curve and should be clarified in writing at the pre-work meeting. The Contractor at the direction of the CPD PD&ED may be tasked with developing an alignment. Please consult the CPD PD&ED for guidance.

10.2.3.2 Record of Survey (NIC)

A Record of Survey shall be prepared for recording in the appropriate Recording District for the Right of Way survey. All Right of Way surveying completed above in section 10.2.3.1 shall be included in the Record of Survey. The Right of Way corner ties may be combined with the SCD in 10.2.2 Surveying for Design, if a Design Survey is a part of the Contractor's work effort. Consult with the CPD PD&ED for guidance in the preparation of the Record of Survey.
Descriptors for points shall follow the examples at the ADOT&PF FTP site: ftp://ftp.cadastral.info/dot-cadastral/Central-Region-DOT-CAD-Standards/DOT-Survey_4_ROW/Highways/Samples/Documentation

10.2.3.3 Annotated Plats and Research Documents (NIC)

Copies of all of the research documents for the rectangular survey, centerline monuments, ROW monuments and property corners shall be provided, along with annotations of whether the point was searched for and not found, or monument destroyed, or if found it's corresponding project point number and field book and page number. These annotations do not need to be "works of art", and many times are the original paper plat copies, or scans of such, that the field crews had in the field with them. It is important that all corners required to be researched, recovered and located be noted as to its location status during the field survey on the plats. The annotated plats should be indexed in some method (by Section Location, or other logical means), placed in labeled folders organized by the indexing scheme, and such indexing shown on the survey point plot drawing to aid use of the maps.

10.2.3.4 Electronic Photographs (NIC)

To assist in the point identification, verification of markings, condition of monument and accessories, we ask that digital photographs be gathered of all rectangular corners, and all primary monuments located for ROW centerlines, subdivisions, and other property corners. Each corner should have a minimum of three photographs: one readable close-up of the cap, one near distance, and one with an overview of the monument and its surroundings (it helps to have a tripod setup over the point or some other indicator like carsonite post to find monument in surrounding picture). All original Bearing Trees and other accessories of record should also be photographed for these corners. The photographs should be indexed by point number file directories or by file names with the point number in the file name to aid identification of the point. Many times a chalkboard or other similar device can be used in the field to identify the point in the photographs by writing the point legal designation and project point number on the board, and placing board in scene of the pictures.

10.2.3.5 Additional Topography for Right-of-Way Acquisition (NIC)

The Contractor shall collect all topographic information that may affect the cost and/or schedule of defined right-of-way acquisitions for the project, such as culverts, land service or access roads, improvements, apparent contaminated soils or waters, fences and any structures. Septic system, well and building locations are examples of pertinent data, usually outside of the acquisition area, that may affect the value of the right-of-way to be acquired. Structures located on impacted parcels and within the specified distance (200 feet) of the right-of-way centerline shall have dimensions and ties to the centerline shown. For properties that have (or had) buried fuel tanks, collect data to the specified distance (200 feet) from centerline. The data collected for this survey shall be incorporated into the topographic AutoCAD drawing files, project coordinate file, and where applicable, the TIN (10.1.6, B10.1.8, 10.2.2.3.1).

10.2.3.6 Monument Centerline Pre-Construction: (NIC)

When directed by the CPD PD&ED upon completion of the design phase of the project, but prior to advertising for construction, the Contractor, using the previously established project control shall monument the project centerline (PC's, PT's, and no-curve PI's for roads) using conventional methods. All centerline monuments established shall consist of a minimum 5/8 inch X 30 inch rebar (5/8 inch X 10 in pavement) with a 2 inch cap, and stake nearby. Once set, all centerline monuments shall be re-tied to verify their position (10.2.2.1.3), and a comparison to the design coordinates shall be presented to the CPD PD&ED in spreadsheet format. This information shall be presented in the final centerline control report. A plan identifying the type of monument to be set for control, and its proposed location, shall be submitted to the CPD PD&ED prior to the work being performed. Control points from the Design Survey effort may be used for this effort upon approval. It will be the contractors' responsibility to get permission to access any private property. The results of the static referencing shall be a submitted to the Department in the following format:

1. The centerline staking report will be submitted in a tabulated three ring binder or in PDF format on a CD. The CD will be organized with folders for ease of finding data.

2. A narrative describing the purpose of the survey, methods used, crew, equipment and the source of the horizontal control will be included. The narrative will describe which monuments were referenced from what control. A spreadsheet showing the final coordinates for the control and centerline points sealed by the PLS responsible for the survey will be included.

3. A complete and accurate description of the control points, including photographs, will be included. The control points will be tied to the CORS system. Once the coordinate values are established for the control network they will be held.

4. If RTK GPS methods are pre-approved by the Departments Survey Manager, then a report of the "One-Step Calibration", "Site Calibration", or "RTK Localization" will be included with the submittal. This report should show the relationship of the measured positions to the record positions supplied by the Department. This report should also give the translation parameters that were applied to the NAD83 coordinates in order to transform to the local system.

5. A spreadsheet showing the comparison between the set position and the design coordinates shall be included. It is not necessary to perform an adjustment on the centerline points. The mean values can be reported as the final position, along with Quality/Difference between the vectors. The spreadsheet should identify the control points and which monuments were referenced using those control points.

6. Do not establish project coordinates on the control points or the referenced monuments. All coordinates will be reported in State Plane.

7. A record of survey will not be required.

10.2.3.7 Deliverable Items

The Contractor shall submit the following items related to the Right-of-Way Survey: The deliverables shall be organized on the CD in folders according to the following list. Only submit what is required for your specific project. Do not submit extra information not required by the CPD PD&ED. Folder 1 "Report Docs" (item A and the spread sheet from item I), Folder 2 "Field Books" (If you choose to submit a PDF), Folder 3 "ASCII Files" (Items D & E can be combined here), Folder 4 "AutoCAD Drawing Name" (item F), Folder 5 "GPS Data", and Folder 6 "Photos". All paper submittals shall be bound and tabbed in a three ring binder, with a label on the spine. The Contractor shall submit the following items related to their Survey to the Borough Project Manager:

	Deliverable Description	*Required*
A.	Right of Way Survey Report Memo. A brief description of the survey methods, equipment, computations, quality control checks and accuracy estimates [only if not done in surveying for design).	√
B.	The original field books or PDF indexed, reduced, stamped and checked. (10.1.4)	√
C.	Annotated Plats and Research Documents. (10.2.3.1.1)	√
D.	An ASCII coordinate file containing all recovered, computed, and topographic points in the local system. Electronic and hard copy printout shall be submitted. Elevations that are not valid TIN elevations shall be shown as -9999. Draft coordinate files shall be submitted upon completion of note reduction. (10.1.8)	√
E.	An ASCII files listing all descriptors used and an expanded description of their meanings. Descriptors not used on this project shall not be included in this list. This file shall be submitted with the draft coordinate file. (10.1.8)	√
F.	Record of Survey for the Right of Way Survey (10.2.3.2) [NIC]	
G.	For GPS control surveys, the Contractor shall also provide RINEX GPS data files of 8 hours length for at least 2 control points. (10.2.2.1.5)	√
H.	Electronic Photos (10.2.3.4)	√
I.	Centerline Control Report (10.2.3.6) [NIC]	

10.2.4 RIGHT-OF-WAY MAPPING (NIC)

10.2.4.1 General

The Contractor shall perform the services necessary to establish the existing Right of Way centerline, and prepare Record of Survey Maps; and, prepare Base Maps, Right of Way Maps, and Parcel Plats, in accordance with the ADOT&PF Right of Way Manual and specific instructions from the Borough Project Manager. Services by the Contractor to modify the Plans Specifications & Estimates (PS&E) assemblies, as required to accommodate the right of way negotiations, shall be performed as part of the PS&E task.

10.2.4.2 Base Maps

Base maps will be ink on vellum or mylar and shall show the entire project limits and shall include an ADOT&PF standard Right of Way title sheet, symbol sheet, tract maps, and plan sheets, using ADOT&PF AutoCAD format at the scale and layout. The plan sheets shall show the following information:

1. Existing property boundaries, including all Public Land Survey System survey lines.
2. All subdivisions, including name, plat number, and lot and block designations or aliquot parts description.
3. Existing roadway centerline.
4. Existing rights-of-way
5. Improvements.
6. Other features required by the Right of Way Manual and /or the CPD PD&ED.

A. 10.2.4.2.1

When preparing Base Maps, the Contractor shall (a) thoroughly reread and document existing right-of-way rights (b) resolve problems with existing Right of Way and boundary locations and (c) analyze preliminary engineering information to determine where additional survey ties are required. The Contractor shall provide a written summary of (any significant) Boundary Problems encountered in making specific boundary determinations, including rationale for the solution.

B. 10.2.4.2.2 Index Sheets (Point Plots)

The Contractor shall provide Base Map Index Sheets that depict the existing centerline and right of way lines, adjacent property lines including rectangular survey lines, and point numbers of all found and calculated points associated with said lines. The drawings shall be on vellum at a scale equal to the scale of the Base Maps.

The Contractor shall provide a Survey Point Plot in AutoCAD format showing all recovered monuments (including those recovered in the Control Surveys) with point numbers for the purpose of point number referencing. The scale shall be adequate to clearly show the relationship of the corners, and shall be tailored to the density of the points. A Printout of Adjusted Coordinates with descriptions of the corners shall accompany the plot along with the ASCII coordinate file with descriptors and AutoCAD drawing file. An ASCII file and hard copy printout listing all descriptors used and an expanded description of their meanings shall accompany all coordinate file submittals. The survey point plot shall be sealed, signed, and

certified by the PLS responsible for the services, currently registered in the State of Alaska. The certification shall state the survey standard that was followed in performing the services.

C. 10.2.4.2.3

The Contractor shall not begin preparing Base Maps without prior specific written authorization from the CPD PD&ED.

10.2.4.3 Right of Way Maps (NIC)

Maps shall be ink on Mylar and shall include a title sheet, standard right of way symbols sheet, tract maps, plan sheets, and monument summary sheets for the entire project. The plan sheets shall show all the information required for the Base Maps plus the following information:

1. Proposed Right of Way.
2. Proposed centerline.
3. Easements.
4. Parcels.
5. Parcel Information Block.
6. Proposed slope limits.
7. Revision block.
8. Other features required by the Right-of-Way Manual and /or the CPD PD&ED.

When preparing Right of Way Maps, the Contractor shall:

1. Resolve survey conflicts with existing right of way and boundary locations.
2. Analyze preliminary engineering information to determine where additional survey ties are required.
3. Examine Title Reports and adjust preliminary boundaries as required.
4. Compute the Take and Remain areas of each parcel based on right of way requirements supplied by the CPD PD&ED. Provide in a notebook format, inverse information for properties affected by acquisition. Include inverses for the larger parcel, take including easement, net take, and remain areas. Provide a plot of the immediate area showing property lines and associated point numbers.

10.2.4.4 Parcel Plats (NIC)

The Contractor shall prepare plats for all parcels to be acquired for this project.
Note: full takes do not need a parcel plat prepared. Parcel plats shall contain the information required by the ADOT&PF Right of Way Manual. Parcel Plats shall be prepared during the Right of Way Plan stage of development. The Contractor shall make revisions to Parcel Plats requested by the CPD PD&ED. Parcel Plats shall use the ADOT&PF standard 8-1/2 by 11 inch format on mylar, vellum, or paper as specified by the Borough Project Manager. Plats shall be at a scale suitable for legibility and clarity of detail using ADOT&PF AutoCAD format and shall contain information as required by the ADOT&PF Right of Way Manual and the parcel plat checklist. A Title block and border drawing file will be supplied by the CPD PD&ED.

10.2.4.5 Copies

The Contractor shall provide a hard copy of all draft and final maps and parcel plats and a copy on CD or DVD discs or with project coordinate file with descriptors and a drawing file in AutoCAD (version as specified by CPD PD&ED).

10.2.4.6 Right-of-Way Negotiations

The Contractor shall provide technical support for right-of-way negotiations. This shall include interpreting documents prepared for the project and explaining project impacts to the Capital Projects personnel, property owners, and others. The Contractor shall also attend meetings as required to make presentations and answer questions.

10.2.4.7 Presentation

The Contractor shall make an oral presentation with visual displays of Right-of-Way requirements to the Capital Projects personnel when requested near the beginning of the Right-of-Way acquisition activities. The presentation shall provide a project overview and show the proposed project features and impact on adjoining properties. Features shall include side streets, pathways, sidewalks, medians, curb and gutter, slope limits, impacts to driveways, striping, illumination, and signalization. Property information shall include lot boundaries, buildings, driveways, and any other features that will help the CPD PD&ED in negotiations with affected property owners, and others to assess project impacts. Visual displays shall be at a scale to clearly show all features without being cluttered. Different colors shall be used to differentiate between project features and adjoining property features.

10.2.4.8 Reviews and Schedule

The Contractor shall submit drafts of the Base Maps, Right of Way Maps and Parcel Plats, for the Capital Projects review, in accordance with the following: Base Maps shall be submitted with the Local Review Assembly. Right of Way Maps including proposed takes for project construction shall be submitted with the Plans-In-Hand Review Assembly. Right of Way Maps including proposed takes for the project and all required utility relocations shall be submitted within four months of the Plans-In-Hand Review submittal. Current Right of Way Maps shall be submitted with the PS&E Assembly. The Summary of Boundary Problems shall be submitted with the drafts of Base Maps. The CPD PD&ED shall have a minimum of four weeks for the return of written comments. The Contractor shall address comments to the satisfaction of the CPD PD&ED prior to submitting final documents. Final Right of Way Maps and Parcel Plats shall be submitted at the same time, after all parcels have been acquired.

10.2.4.9 Deliverable Items

Type of Document	*Paragraph*	*Copies*	*Originals*
Base Map	10.2.4.2		
Draft	10.2.4.5	2	0
Flash/Thumb Drive	10.2.4.5	1	0
Final	10.2.4.5	4	1
Flash/Thumb Drive	10.2.4.5	1	0
Summary of Boundary Problems	10.2.4.2.1	1	0
Index Sheets (Point Plots)	10.2.4.2.2	1	1
Right of Way Maps (NIC)	10.2.4.3		
Draft	10.2.4.5	2	0
Flash/Thumb Drive	10.2.4.5	1	0
Final	10.2.4.5	4	1
Flash/Thumb Drive	10.2.4.5	1	0
Parcel Plats (NIC)	10.2.4.4		
Draft	10.2.4.5	2	0
Flash/Thumb Drive	10.2.4.5	1	0
Final	10.2.4.5	4	1
Flash/Thumb Drive	10.2.4.5	1	0

10.2.5 Post Construction Surveying (NIC)

When directed by the CPD PD&ED, and upon completion of the construction phase of the project, the Contractor shall establish and monument the project centerline (or a random control line) as determined by the CPD PD&ED. Monument type and spacing shall be determined in discussions with the CPD PD&ED.

In the case of a project centerline, the points shall be established using the Record of Survey from the Pre-Construction effort. Right of Way monumentation that was referenced prior to construction will need to be field verified that they were not disturbed. A digital photo will be required as proof. Any disturbed ROW corners will need to be reestablished as part of this effort. A final Record of Survey shall be completed that shows any new monumentation set.

10.2.5.1 Provided Items (NIC)

The CPD PD&ED will provide the following:

1. The Record of Survey with the control values for the project centerline, and the values for any ROW monuments that were referenced.

2. The control for establishing the random line if no project centerline is set.

10.2.5.2 Deliverables

	Deliverable Description	*Required*
A.	Right of Way Survey Report Memo. A brief description of the survey methods, equipment, computations, quality control checks and accuracy estimates.	
B.	The original field books or PDF indexed, reduced, stamped and checked. (10.1.4)	
C.	An ASCII coordinate file containing all recovered, computed, and set points in the local system (if provided). Electronic and hard copy printout shall be submitted. Elevations that are not valid TIN elevations shall be shown as -9999. (10.1.8)	
D.	An ASCII files listing all descriptors used and an expanded description of their meanings. Descriptors not used on this project shall not be included in this list. (10.1.8)	
E.	Record of Survey for the Right of Way Survey. (10.2.3.2)	
F.	Provide OPUS reports, using 8 hours of GPS Data for at least 2 control points, as a check on the control, before beginning work.	
G.	Electronic Photos (10.2.5)	

ARTICLE 14

BRIDGE REPAIR DESIGNS
(Bridge Repair Design and Estimates)
Task #2

Design of repairs, following FRA and AREMA design standards, will be based on an inspection/evaluation damage report stamped/sealed by a professional Structural Engineer licensed in the State of Alaska.

The design consultant and bridge inspector are expected to review additional information provided by the MSB that includes the original bridge design plan sets prior to the initial inspection/evaluation task.

Design consultant will be responsible for any permits required to construct design repairs.

ARTICLE 20

PLANS, SPECIFICATIONS AND ESTIMATE
Task 10

20.1 General

The Contractor shall provide Plans, Specifications and Estimate (PS&E) assembly suitable for project bidding and construction. The PS&E assembly shall present the design that best accommodates the information derived from prior tasks.

20.2 Content and Organization of Plan Set

The plans shall contain at least the following sheets, assembled in the order listed:

a. Title

b. Miscellaneous Details

c. Traffic Control Plan (if required)

d. Retaining Walls (if required)

20.2.1 Title

Title Sheets shall include the following information:

1. Project title, project numbers and description of work
2. Vicinity map and project location map.
3. FEMA Bridge Number and mile point designation (if applicable).
4. Plan sheet index.
5. List of applicable standard drawings.
6. Project summary table that gives width and length of major roadway segments.
7. Table of design designations for the construction and design year for each section that includes:
    a. Current year and design year average daily traffic.
    b. Design year design hourly volume.
    c. Design speed.
    d. Percent trucks.
    e. Design year equivalent axle loads.

20.2.2 Typical Sections

The number of typical section sheets prepared for rail bridges and approaches shall be minimized i.e. changes in structural section widths shall be shown as tapers on plan and profile sheets. The Table of

Estimating Factors shall be on the first typical section sheet. Each typical section shall include the following information:

1. Bridge number and stationing for which the typical section applies.
2. Bridge cross section.
3. Embankment bridge approach and abutment slopes cross slopes and side slopes.
4. Bridge profile.
5. Structural sections.
6. Original ground.
7. Ordinary High Water Elevation of waterbody (if bridge passes over creek/slough)
8. Waterbody width beneath bridge at OHW (if bridge passes over creek/slough)
9. General Notes for the plan set.

20.2.3 Plan and Profile

Plan and Profile Sheets shall show the following:

a) FEMA Bridge numbers.

b) North arrow.

c) Existing bridge and appurtenances.

d) Existing topographic features.

e) New construction.

f) The horizontal and vertical alignment of all roadway centerlines. The horizontal scale shall be 1"=50' and the vertical scale shall be 1"=5'.

g) Bridge and rail embankment approach centerline stations.

h) All bridge and appurtenant features not shown on other sheets such as gabion retaining walls, abutment fill slopes, drainage improvements, slope limits, pedestrian amenities, erosion and sediment control features, etc.

i) Rail corridor Right of Way.

j) Wetlands.

20.2.4 Traffic Control Plan

The Traffic Control Plan shall present a method for constructing the project and maintaining both vehicular and pedestrian traffic through the rail corridor. It shall be developed in accordance with the "Alaska DOT Traffic Manual." The Plan shall include all proposed work included in the PS&E package. A permanent construction signing detail shall be included.

20.2.4.1 Phases

DELETED

20.2.4.2 Detours

The Plan shall provide alignments, typical sections, and signing for proposed detours.

20.3 Estimate

The Contractor shall submit an Engineer's Estimate with each of the plan reviews in a format approved in advance by the CPD PD&ED. Pay item numbers and names shall be as given in the Standard Specifications, Standard Modifications or Special Provisions. The Contractor shall obtain pay item numbers for items not listed in the Specifications from the CPD PD&ED. The Contractor shall provide unit prices and total estimated costs for all items. Estimates shall be signed and dated by both preparer and checker. For review submittals, copies of the Estimate will be included with the Specifications immediately behind the cover page.

20.3.1 Confidentiality of Estimate
The Contractor shall not release information pertinent to the Engineer's Estimate, other than to the CPD PD&ED, without the express written authorization of the CPD PD&ED.

20.4 Reviews and Schedules
The Contractor shall submit to the CPD PD&ED the documents listed below under "Deliverable Items."

20.4.1 Local Review.

The Local Review assembly shall consist of plans and an estimate for each alternative under consideration. Other assemblies include submittal of the plans, specifications, and an estimate. The CPD PD&ED shall be allowed two weeks for the return of written comments for each review assembly. The Contractor shall address these comments to the satisfaction of the CPD PD&ED prior to the next submittal. Reviews shall be conducted according to Chapter 4 of the ADOT&PF Highway Preconstruction Manual.

20.4.2 Plans-In-Hand Review.

This assembly shall consist of plans, specifications, and engineer's estimate and represent the design effort approximately 75% complete. Because this assembly will be used to begin right of way appraisal and acquisition and also to begin design of any required utility relocations, the slope limits given on the plans shall be final. The Contractor shall submit one set of full-size black line plan sheets plus the number of half size sets stated below in the list of Deliverable Items. A field inspection of the project and a meeting shall be conducted to review the plans and discuss comments. The Contractor's personnel who are in-responsible-charge of the PS&E assembly shall participate in the meeting and the field review

20.4.3 PS&E Review

This assembly shall consist of complete plans, specifications and engineer's estimate plus the following:

1. A recommended number of calendar days for the construction contract or a recommended construction contract completion date.

2. A brief report of significant changes made to the assembly after the Plans-In-Hand Review meetings that were not discussed at that meeting.

3. A brief (one or two sentence description) of the work required to construct this project.
4. A full-size black line plan set.
5. Specifications, including the Special Notice to Bidders.
6. Engineer's estimate.
7. The Plans-In-Hand letter from the Contractor to the CPD PD&ED that lists all the comments made on the Plans-In-Hand Review assembly and a response to each.
8. Draft Erosion and Sediment Control Plan.
9. A technical memo describing all non-standard design features and the reason(s) for them.
10. Draft Submittal Register listing all submittals that the Borough expects to receive from the construction contractor.

20.4.4 Final PS&E Assembly.

This review assembly shall consist of complete, sealed and signed, Plans, Specifications and Engineer's Estimate plus the following (Documents that include inadequate response to previous comments and documents with errors or omissions will not be accepted until such problems are corrected):

1. A recommended number of weeks to advertise for construction bids.
2. A brief one or two sentence description of the work required to construct this project.
3. A brief report of significant changes made to the assembly after the Pre-PS&E Review meeting but which were not discussed at that meeting.
4. The original of all development documents as presented in Article 21.
5. A full-size plan set plus the number of half size sets stated in the list of Deliverable Items.
6. Specifications, including the Special Notice to Bidders.
7. Engineer's Estimate.
8. A letter from the Contractor to the CPD PD&ED that lists all the comments made on the Pre-PS&E Review assembly and a response to each.
9. Erosion and Sediment Control Plan.
10. Letter describing any unusual features and the reason(s) for them.
11. A request for the DBE goals on a form provided by the CPD PD&ED that shall include a list of pay items in the engineer's estimate.
12. Design summary memorandum noting major changes since completion of the Design Study Report (if any).
13. Submittal Register listing all submittals that the Borough expects to receive from the construction contractor.

20.5 Deliverable Items

Type of Document	*Para*	*Copies*	*Originals*
PIH PS&E Assembly			
Half Size Sets	20.4.2	3	0
PS&E Review Assembly			
Half Size Sets	20.4.3	3	0
Final PS&E Assembly			
Half Size Sets	20.4.4	3	0
Full Size Sets		0	1

ARTICLE 21

PS&E INTERPRETATION DURING BIDDING
Task 4

The CPD PD&ED reserves the right to negotiate and add these services by amendment; however, is under no obligation to do.

21.1 General

The Contractor shall assist the CPD PD&ED as requested during project bidding. Personnel who were in responsible charge for engineering and land surveying, and other personnel as necessary and appropriate, shall be available to interpret and clarify documents prepared during project development and to assist the CPD PD&ED with preparing any necessary addenda to the bid documents. When performing these services, the Contractor shall not communicate about this project with any potential bidders for its construction.

21.2 Documents

Within a month after the bid opening, the Contractor shall submit to the CPD PD&ED the original of all documents prepared or modified during bidding on a flash/thumb drive. The Contractor shall keep a copy of these documents until construction is complete.

ARTICLE 22

ASSISTANCE DURING CONSTRUCTION
Task 5

22.1 General

The Contractor shall assist the CPD PD&ED with one field inspector and one professional structural engineer in charge of the design and construction management. Personnel who were in responsible charge for engineering and other personnel as necessary and appropriate, shall be available to interpret and clarify documents prepared during project development and bidding; to review and approve shop drawings, retaining wall forming plans; and to assist the CPD PD&ED with preparing any necessary change documents. The Contractor shall always include the CPD PD&ED in all written correspondence. If communicate is direct with the successful bidder as summary will be written and sent to the CPD PD&ED. All changes, directives, shall be through the CPD PD&ED.

22.2 Documents

Within a month after the CPD PD&ED accepts the constructed project, the Contractor shall submit to the CPD PD&ED the original of all documents prepared or modified when performing the services for this task. Redline construction plans will be delivered as close out documents.