

San Jacinto River Authority
San Jacinto River and Tributaries Sediment Removal and Sand Trap Development
Work Order No. 1

SCOPE OF WORK

General

Sedimentation in the San Jacinto watershed's rivers and streams has been well documented over the last several decades. This effort will focus on sediment trapping facilities located in the West Fork San Jacinto mainstem and the East Fork San Jacinto mainstem to reduce sediment loads from flowing into Lake Houston. It will begin with an assessment of potential trapping facilities sites and then rank these sites using implementation strategies and efficacy.

This effort will conclude with three conceptual solutions for capturing sediment either on the West Fork and East Fork or exclusively on the West Fork. Freese and Nichols Inc.'s (FNI or Consultant) "Sedimentation Strategy for West Fork San Jacinto River and Spring Creek" report, developed as part of the San Jacinto Regional Watershed Master Drainage Plan project (Draft pending as of January 2020), will be leveraged in locating these sediment trapping facilities.

Location preference for these facilities will be in regions where sediment deposits naturally to take advantage of favorable hydraulic conditions for sediment trapping. Additional preferences will be: proximity to public roads, proximity to existing Aggregate Production Operation (APO) facilities and areas where environmental impacts will be minimal.

Each facility will be evaluated to understand its efficacy at trapping sediments and what are the anticipated benefits in reducing sediment accumulation in river channels downstream.

The Consultant shall provide:

TASK 1101 – Project Management
FMPR0004.1001.2C001.30020

1101.1 Project Management

1. Project Management: Provide for the management of the resources of the Consultant to meet the technical, financial, and schedule requirements of SJRA. This shall include the overall management of the project and the various specialized discipline teams responsible for the development of the project. Schedule and participate in meetings (in person or by phone, as appropriate) with SJRA, Consultant's sub-consultants, SJRA's third party consultants, and stakeholders (as appropriate). Harris County Flood Control District (HCFCD) will be invited to all project meetings, and project deliverables will be provided to HCFCD for the opportunity to review.

1101.2 Project Kickoff Meeting

1. A project kickoff meeting between the Consultant and SJRA personnel will be held at the beginning of the project to accomplish the following:
 - a. Review the Consultant's scope of work and discuss project expectations and goals.
 - b. Review the Consultant's proposed schedule and critical milestones.
2. This meeting is to be held at SJRA's Woodlands office, or other location as directed by SJRA, and is anticipated to last up to two (2) hours.

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1101.3 Project Update Meetings

1. Project Update Meetings: Consultant shall participate in up to four (4) one-hour conference call meetings, in addition to other meetings described in this scope of work, with SJRA to present detailed status updates of the project's progress and budget and discuss any major issues identified.
2. Consultant understands that all physical (in person) meetings shall occur at SJRA's Woodlands Division office or as directed by SJRA. All meeting agendas, workshop planning information and handouts, meeting notes, and other applicable information pertaining to each specific meeting or workshop shall be developed and distributed by the Consultant.

1101.4 Quality Assurance and Quality Control

1. Consultant shall disseminate pertinent project information internally and externally, implement Quality Assurance (QA) and Quality Control (QC) measures, and submit deliverables as required per agreed-upon project schedule.

1101.5 Project Status Reports and Invoice

1. Project Schedule Development and Updates: Develop, manage, monitor, update, and coordinate (in coordination with SJRA staff) project schedule throughout the life of the project based on changes or necessary updates.
2. Project Status Reports: Provide written project status reports to SJRA once per month throughout the duration of the project. Project status reports shall include, at a minimum, a summary description of activities completed, description of activities planned for the next 30 days, financial status of the project, status of schedule for the project, and identification of any technical or other issues which may have an impact on the overall project budget and/or schedule. Project status reports shall be provided to SJRA with each invoice.
3. Invoicing: Consultant shall submit invoices monthly by the 10th day of the month following the month being invoiced for. Invoices shall include a record of Consultant's activities and deliverables completed within the month, and note activities planned for the next month. Invoices shall be submitted to ap@sjra.net. Coordinate with SJRA Project Manager to determine appropriate format and content for invoice submittals.
4. Consultant shall notify assigned SJRA Project Manager in writing that Consultant has expended eighty percent (80%) of the currently approved SJRA Professional Services Agreement and/or Work Order amount within seven (7) calendar days of Consultant reaching this expenditure milestone (80% expenditure milestone). Written notification shall be provided regardless of compensation type (i.e., lump sum, cost-plus multiplier, time-and-materials, etc.). Written notification shall include a statement by Consultant indicating whether remaining amount is adequate to complete current SJRA approved Professional Services Agreement and/or Work Order Scope of Work.

1101.6 Document Control

1. Document Control: SJRA shall utilize a SharePoint site to transmit data for this project. Consultant shall utilize this system as a management tool and repository of all data, reports,

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photographs, letters, memoranda, design documents, models, and other information as directed by SJRA.

2. If requested by SJRA, Consultant shall participate in a QA Audit to be performed by SJRA at Consultant's office. Consultant shall cooperate with Auditor by providing access to project related electronic and hard copy files, and shall correct deficiencies noted in audit report provided by Auditor.

Deliverables: Monthly Status Reports

Monthly Status Reports shall be submitted electronically (.pdf) to SJRA via email to ap@sjra.net, with invoices, no later than the 10th day of every month to coincide with SJRA invoicing requirements throughout the duration of the Work Order.

Meeting Agendas, Handouts, and Minutes

Proposed agendas: Submit one (1) electronic copy (editable version) at least three (3) calendar days prior to meeting. Consultant will provide necessary number of hard copies at in-person meetings.

Meeting minutes: Submit draft meeting minutes (electronic editable version) within three (3) calendar days of meeting. Receive SJRA comments. Submit one electronic version (.pdf) via SharePoint of final meeting minutes within three (3) calendar days of receipt of comments on the draft meeting minutes.

Task 1102 – Map Preliminary Sediment Trapping Locations
FMPR0004.1001.2C001.30041

1102.1 West Fork

1. Obtain raster files used to map areas of aggradation and degradation from the “Sedimentation Strategy for West Fork San Jacinto River and Spring Creek” report, referred to as the 2020 Report. Raster files were created by subtracting older LiDAR data from more recent LiDAR data. In locations where the more recent LiDAR data is higher than the older LiDAR data, this is a location where sediment may have deposited. At locations where the more recent LiDAR is equal to or greater than two feet higher than the older LiDAR, confirm sediment deposition has occurred using aerial photos and calculate volume of sediment deposition. Rank aggradation sites by volume and locate whether the site was in either the sediment transitional region or the sediment deposition region (as mapped in the Sedimentation Strategy for West Fork San Jacinto River and Spring Creek report Report).
2. Obtain river centerline profiles from preliminary RAS models and effective RAS models from the San Jacinto Regional Watershed Master Drainage Plan project. Note the regions where

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river centerline profiles have flattened. Locate the regions using GIS and create a shapefile for each.

3. Obtain the digital elevation map from the 2020 Report and map locations where there is natural constriction in valley width. Note if this restriction is due to human activity (road crossings, etc.) or natural.
4. Cross reference valley wall restrictions with largest aggradation sites and areas where river centerline profile has flattened. Create shapefile of these locations. Each location is referred to as preliminary sediment trap location. Add all aggregate production operation (APO) sites to preliminary sediment trap location shapefile.

1102.2 East Fork (Note, Tasks 1102.2 (1) through (3) have been completed for the West Fork as part of the Sedimentation Strategy for West Fork San Jacinto River and Spring Creek report)

1. Define the stream network within the East Fork using ArcGIS's watershed analysis extension for both the 2018 LiDAR and the historic LiDAR. Historic LiDAR refers to LiDAR data measured in either 2008 or 2001. LiDAR measured in 2001 collected topographic data in Harris County, LiDAR measured in 2008 collected topographic data in Montgomery County.
2. Measure stream deflection between the 2018 LiDAR and historic LiDAR. Create maps depicting stream deviation.
3. Subtract historic LiDAR from the 2018 LiDAR. Map locations where 2018 LiDAR is higher which represents regions where sediment deposited, for example in sand bars. Map locations where the 2018 LiDAR is lower, for example at eroding stream banks. Calculate volumes for each condition where there is a 2 foot or greater difference between the LiDAR data sets.
4. Replicate tasks 1102.1 (1) through (4) using results from 1102.2 (1) through (3).

1102.3 Preliminary Site Characterizations

Note: Work Proposed For this Task and All Remaining Tasks are For Both the East Fork and West Fork

1. From the findings of 1102.1 and 1102.2, identify the ten areas with the largest volumes of sediment deposition, including at a minimum, the two largest volume areas on the East Fork and the two largest volumes at an APO or as directed by SJRA.
2. At each of the ten areas, measure the surface area at multiple vertical foot increments (2 feet, 4 feet, 8 feet, 12 feet). Measure surface areas of APO pits proximal to riverbanks.
3. Using readily available GIS data from the following sources, note pertinent environmental or jurisdictional considerations which are proximal to preliminary trapping facility locations.
 - FEMA Floodplain
 - National Wetland Inventory
 - Texas Historical Commission
 - Texas Parks and Wildlife

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- US Fish and Wildlife Service
4. For each preliminary facility location, map whether the proposed facility is on public property, private property or both. Note the number of landowners. Measure distance from nearest public road.
 5. Consult with appropriate stakeholders to understand existing recreational uses of the West Fork and East Fork. Map and measure distance to notable recreational facilities (parks, canoe/boat ramps, popular swimming locations, etc.). FNI anticipates to collaborate with SJRA on stakeholder group members. FNI assumes the stakeholder group to potentially include: Montgomery County Parks, Montgomery County Engineering, Harris County Engineering, Harris County Parks.
 6. Rank preliminary facilities using the following: sediment deposition volume, potential sediment storage volume, proximity to existing roads, proximity to existing APO facilities.
 7. Summarize findings and submit narrative with a list of preliminary sediment trapping facility rankings to SJRA. The narrative and rankings list will become part of the “Preliminary Sediment Trapping Locations” memo as described in task 1102.6. Obtain feedback on ranking of sites, and adjust ranking as needed.

1102.4 Preliminary Sediment Trapping Facility Ranking and Efficacy

1. Following SJRA’s guidance, select four preliminary sediment trapping facilities from the ranked list as described in 1102.3 (7).
2. For each facility, select two tributaries with the largest drainage area between the facility and the upstream extent of the study area. Upstream extents of the East Fork and West Fork will match the upstream end of each Fork’s respective upstream boundary from the San Jacinto Regional Watershed Master Drainage Plan project.
3. Repeat tasks 1102.2 (1) through (4) between the tributary’s confluence with the mainstem and three miles upstream on the tributary.
4. Summarize the volume of sediment entrained (as calculated in 1102.2 (3)) for the West Fork mainstem, East Fork mainstem and the tributaries selected in 1102.4 (2). Determine the number of years between when the 2018 LiDAR was collected and when the historic LiDAR was collected and divide this number into the summarized volume of sediment entrained upstream of each preliminary trapping facility,. The quotient is an approximation of the annual sediment load to each preliminary sediment trapping facility.
5. Calculate the number of years before each preliminary sediment trapping facility would be filled with sediments.
6. Map surficial geology, location of Deweyville terraces and highly erodible soils upstream of each site. Measure the length each mainstem and each tributary runs through these features and apply to appropriate facility locations.
7. FNI will submit the four selected sites and the narrative from task 1102.3(7) to the US Army Corps of Engineers to solicit if any additional information about the sites can be obtained, and

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to obtain preliminary information on permitting requirements if provided within the scheduled time frame. FNI will respond to technical questions.

1102.5 Windshield Survey

1. SJRA will coordinate with private landowners (if necessary) to gain access to the land where the four selected preliminary sediment trapping facilities are located, and to obtain preliminary information on willingness of landowner to consider providing land for sediment trapping facility. If land access cannot be obtained, or if a landowner expresses no willingness to provide land for future facility, for one of the four selected preliminary facilities, SJRA will select another preliminary sediment trapping facility site.
2. Complete a windshield survey of the four selected preliminary sediment trapping facilities access has been obtained for. Document construction opportunities and constraints (including potential environmental issues) and complete a sketch map of each site and note potential sediment trapping locations and methods. Describe expected level of difficulty of implementing a sediment trap at each location. If a facility is located at or near an APO, note opportunities and constraints to capture sediment in an existing pit or other location. Note water depth in pits proximal to river.

1102.6 Draft Preliminary Sediment Trapping Locations Memo

1. Submit a draft Preliminary Sediment Trapping Locations memo to SJRA summarizing the findings from tasks 1102.1 through 1102.5. This includes the narrative and preliminary ranking list from 1102.3. Use ranking criteria from 1102.3, maintenance frequency, flood water surface elevation impacts and expected level of difficulty implementing sediment trap, as well as information from the windshield survey results (1102.5), to rank the four sites.
2. Utilize a project update meeting to select three sites from the four sites identified in the Preliminary Sediment Trapping Locations memo.

1102.7 Final Preliminary Sediment Trapping Locations Memo

1. Organize comments received from SJRA and HCFCD on draft memo (1102.6). Incorporate comments and submit final version.

Deliverables: Draft Preliminary Sediment Trapping Locations Memo

Submit draft memo to SJRA via SharePoint (editable version) within 58 calendar days of NTP.

Final Preliminary Sediment Trapping Locations Memo

Submit final memo to SJRA via SharePoint (PDF) within 72 calendar days of NTP.

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Task 1103 – Characterize Sediment Trapping Efficacy
FMPR0004.1001.2C001.30041

1103.1 Geotechnical Cores and Pebble Counts

1. Obtain geotechnical cores of deposited sediments (in sand bars, or gravel bars) upstream of each site. Obtain one core for each site (three cores total). Complete sediment fingerprinting by measuring levels of ²¹⁰Pb, ¹³⁷Cs or an equivalent radioactive isotope commonly found in atmospheric deposition in the watershed. These radioactive isotopes have an affinity in bonding with silt on top of the landscape.
2. Determine the percentage of sediment in the cores that is bound to this isotope. A high percentage of sediment with this isotope would suggest a high percentage of the sediment load occurs from the landscape (resulting from land use practices) and not alluvial erosion. This understanding will influence recommended sediment mitigation practices.
3. Complete particle size distribution of core samples using laser diffraction or sieve analysis for surface armor layer and subsurface layer. Determine fraction of sediments that are bedload, suspended load and wash load.
4. Complete a modified Wolman's pebble count of the surface armor layer at each sand bar or gravel bar a core is obtained from and a one pebble count of subsurface layer at each sand bar/gravel bar.

1103.2 Duplicate HEC-RAS Model

1. Obtain most up to date San Jacinto Regional WMDP preliminary RAS modeling results and replicate modeling results. Note locations where the three selected preliminary sediment trapping facilities are located. Determine if additional cross sections are needed in the region where preliminary sediment trapping facilities are located.

1103.3 Bankfull Hydrology

1. Locate the most proximal stream gage to each of the three sites. Extract average daily discharge gage data for the last several water years. A water year begins on October 1st and runs through September 30th. Calculate a partial duration curve and select the bankfull (channel forming) flow for each stream gage. Correct discharges using drainage area correction method. Compare results to regional regression curves that were developed by Harris County Flood Control District.
2. Extract the hydrograph of the smallest studied discharge from the preliminary model. A hydrograph representative of the hydrology upstream of each preliminary sediment trapping facility will be created. Truncate the preliminary model as needed to include the facility and the region proximally upstream and downstream. Use normal depth for downstream boundary conditions. Correct the hydrograph to fit the bankfull discharge for each site.

1103.4 Existing Condition HEC-RAS Model Runs

1. Amend the San Jacinto Regional WMDP preliminary model with the cross sections from 1103.2 as needed. Run the San Jacinto Regional WMDP preliminary model under existing

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conditions at the 100-year flood event, extract water surface profile and compare results to San Jacinto Regional WMDP preliminary findings.

2. Run the HEC-RAS model under existing conditions for each trapping site (three) and determine which particle size fraction will deposit using incipient motion calculations. Utilize particle size distribution measured in 1103.1.

1103.5 Proposed Condition HEC-RAS Model Runs

1. Amend the HEC-RAS geometry to include the proposed trapping facility (as described in task 1104.3) for each site. Run the model, one run for each site, under proposed conditions and compare sediment deposit results.
2. Compare proposed conditions model's water surface profile to corrected preliminary model's water surface elevation. Complete for the three sites.

1103.6 Draft Sediment Trapping Efficacy Memo

1. Submit Sediment Trapping Efficacy Memo to SJRA summarizing the findings from tasks 1103.1 through 1103.4. Rank the three sites. Use maintenance frequency, flood water surface elevation impacts, removal rate and expected level of difficulty implementing sediment trap, as well as any other applicable/appropriate criteria from previous tasks, in ranking. Evaluate each site individually and in aggregate.

1103.7 Meeting with SJRA and HCFCD

1. Meet with SJRA and HCFCD at the SJRA office to review memo and organize comments.

1103.8 Final Sediment Trapping Efficacy Memo

1. Incorporate comments and submit final version.

Deliverables: Draft Sediment Trapping Efficacy Memo

Submit draft memo to SJRA via SharePoint (editable version) within 87 calendar days of NTP.

Final Sediment Trapping Efficacy Memo

Submit final memo to SJRA via SharePoint (PDF) within 104 calendar days of NTP.

Task 1104 – Develop Conceptual Solutions
FMPR0004.1001.2C001.30041

1104.1 Typical Sediment Trapping Conceptual Solutions

1. Develop narrative and images of multiple typical sediment trap concepts. The narrative will include the materials used in each typical sediment trap concept, typical site description

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(topographic, hydraulic, proximity to infrastructure) and expected maintenance. Typical sediment trap concepts will be organized into two categories, “in-line traps” and “lateral traps”.

1104.2 Create Basemaps

1. For the three selected sites, apply one of the typical sediment trap concepts and develop a site-specific sediment trap.
2. Develop a baseline map for each site. Each baseline map will contain the following: 1’ contours (from 2018 LiDAR), edge of water (from aerial photos), edge of vegetation, proximal roads and observable infrastructure and approximate tops and toes of stream banks. The baseline map will extend to the most proximal potential construction access road and maintenance access road.

1104.3 Develop Site Specific Trapping Facility Concepts

1. Create a conceptual solution for the three selected sites. Create exhibits for each site containing three sheets each: a plan view of the proposed construction access, a plan view of the proposed conceptual solution and an exhibit of the typical details.
2. Develop narrative and a table summarizing the proposed construction activities, expected maintenance frequency (using proposed conditions hydraulic modeling results from Task 1103.5) and activities, estimated quantities of work and an opinion of probable construction cost for each site.

Task 1105 – Downstream Sediment Reduction Benefits
FMPR0004.1001.2C001.30041

1105.1 Identify Sediment Prone Areas

1. Identify regions downstream of each preliminary sediment trapping facility where sediment deposition was mapped in the East Fork mainstem and West Fork mainstem. Cut three cross sections through a region downstream of each facility using the results from 1102.1 and 1102.2. Compare river conveyance area measured by the 2018 LiDAR to the river conveyance area measured by the historic LiDAR.

1105.2 Estimate Reduction of Sediment Accumulation in Each Cross Section

1. Determine the annual rate of sediment accumulation in each cross section. Estimate the reduction of sediment accumulation in each cross section using the anticipated annual storage volume to be achieved at each preliminary sediment trapping facility.

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Task 1106 – Agency Coordination
FMPR0004.1001.2C001.30041

1106.1 – Sediment Facility Fact Sheet and Agency Coordination

1. Organize the feedback from the USACE from coordination effort described in 1102.4(7) and develop a fact sheet for each of the proposed sediment trapping facilities to present the goal and function of the proposed sediment trapping facility to accompany each conceptual solution. If USACE feedback is not received in time for incorporation in this task, and if directed by SJRA, develop fact sheet excluding USACE feedback. The target audiences for the fact sheets are private entities, stakeholders and landowners.

Task 1107 – Conceptual Design Report
FMPR0004.1001.2C001.30050

1107.1 Draft Conceptual Design Report

1. Submit draft report to SJRA summarizing and compiling the findings and data from tasks 1104 through 1106, as well as 1103.5. Rank the three selected sites, including recommendation for sites to continue forward with into PER. Use updated maintenance frequency from hydraulic modeling results (1103.4 and 1103.5), updated flood water surface elevation impacts from hydraulic modeling results (1103.4 and 1103.5) and expected level of difficulty implementing sediment trap, as well as any other applicable/appropriate criteria from previous tasks, in ranking.
2. The report will summarize the anticipated environmental and jurisdictional permitting requirements.
3. Anticipated benefits in reductions of sediment accumulation in downstream areas will be presented.

1107.2 Meeting With SJRA and HCFCD

1. Meet with SJRA and HCFCD at the SJRA office to review memo, organize comments, and discuss recommendations for the Preliminary Engineering Report (Phase II).

1107.3 Final Conceptual Design Report

1. Incorporate comments and submit final version.

Deliverables: Draft Conceptual Design Report

Submit draft report to SJRA via SharePoint (editable version) within 146 calendar days of NTP.

Final Conceptual Design Report

Submit final report to SJRA via SharePoint (PDF) within 161 calendar days of NTP.

Client Name Project Name Date Detailed Cost Breakdown	Project Fee Summary	
	Basic Services	\$257,640.30
	Special Services	
	Total Project	\$257,640.30

Tasks			Labor													Total Hours	Total Labor Effort	
Phase	Task	Basic or Special	Michael Reedy	Cory Stull	Bryan Dick	Jay Scanlon	Anthony Risko	Karl Hoffman	Kristina McLaren	George Fowler	Will Huff	Noe Ortiz	Matt Lewis	Billy Metzger	Connor Kee			Dan Lindner
			Group Manager	Project Manager	Geomorphology	Civil Engineering Lead	Sediment Bedload Collector	Environmental Permitting	Hydraulics	Engineering/Geomorphologic	Engineering	CADD	Hydrology	Administration	Geomorphology	GIS		
			Labor Multiplier															
			Base Rate															
1101			Project Management															\$ -
	1101.1		8	32						24							64	\$13,582.88
	1101.2		4	8						8							20	\$4,393.28
	1101.3		4	6						6							16	\$3,612.68
	1101.4		4	18	2					4							28	\$6,261.16
	1101.5		6	10						6				6			28	\$5,916.20
	1101.6			6													6	\$1,255.44
1102			Map Preliminary Sediment Trapping Locations															
	1102.1								14	9					20		43	\$5,082.24
	1102.2								14	13					30		57	\$6,791.88
	1102.3				4			8		2						20	34	\$5,379.72
	1102.4				4				4	12					56	12	88	\$10,759.96
	1102.5						4			12	12						28	\$5,131.32
	1102.6		8	32	16					40					18		114	\$22,251.32
	1102.7		4	16	12					16							48	\$10,514.00
1103			Characterize Sediment Trapping Efficacy															
	1103.1																	
	1103.2								6								6	\$635.10
	1103.3									2			10				12	\$1,577.32
	1103.4									24							24	\$2,540.40
	1103.5									16							16	\$1,693.60
	1103.6		4	12	8				14	14							52	\$9,797.38
	1103.7		4	8						8							20	\$4,393.28
	1103.8			6	6				10	10							32	\$5,623.70
1104			Develop Conceptual Solutions															
	1104.1					4				16	16						36	\$6,281.72
	1104.2											24				12	36	\$5,538.48
	1104.3				12	14	4	4		16	36	40					126	\$22,997.18
1105			Downstream Sediment Reduction Benefits															
	1105.1								8	2							10	\$1,208.92
	1105.2								6	2							8	\$997.22
1106			Agency Coordination															
	1106.1									4					8		12	\$1,512.56
1107			Conceptual Design Report															
	1107.1		8	16	24	24				40	24				16		152	\$30,151.20
	1107.2		4	8						8							20	\$4,393.28
	1107.3			8	8	8					8						56	\$11,166.88
Total Hours / Quantity			58	186	96	50	8	12	116	298	96	64	10	6	148	44	-	1,192
Total Effort			\$18,427.76	\$38,918.64	\$23,986.56	\$12,135.50	\$2,296.32	\$1,911.84	\$12,278.60	\$53,955.88	\$14,483.52	\$10,379.52	\$1,215.20	\$831.12	\$14,583.92	\$6,035.92	-	\$211,440.30

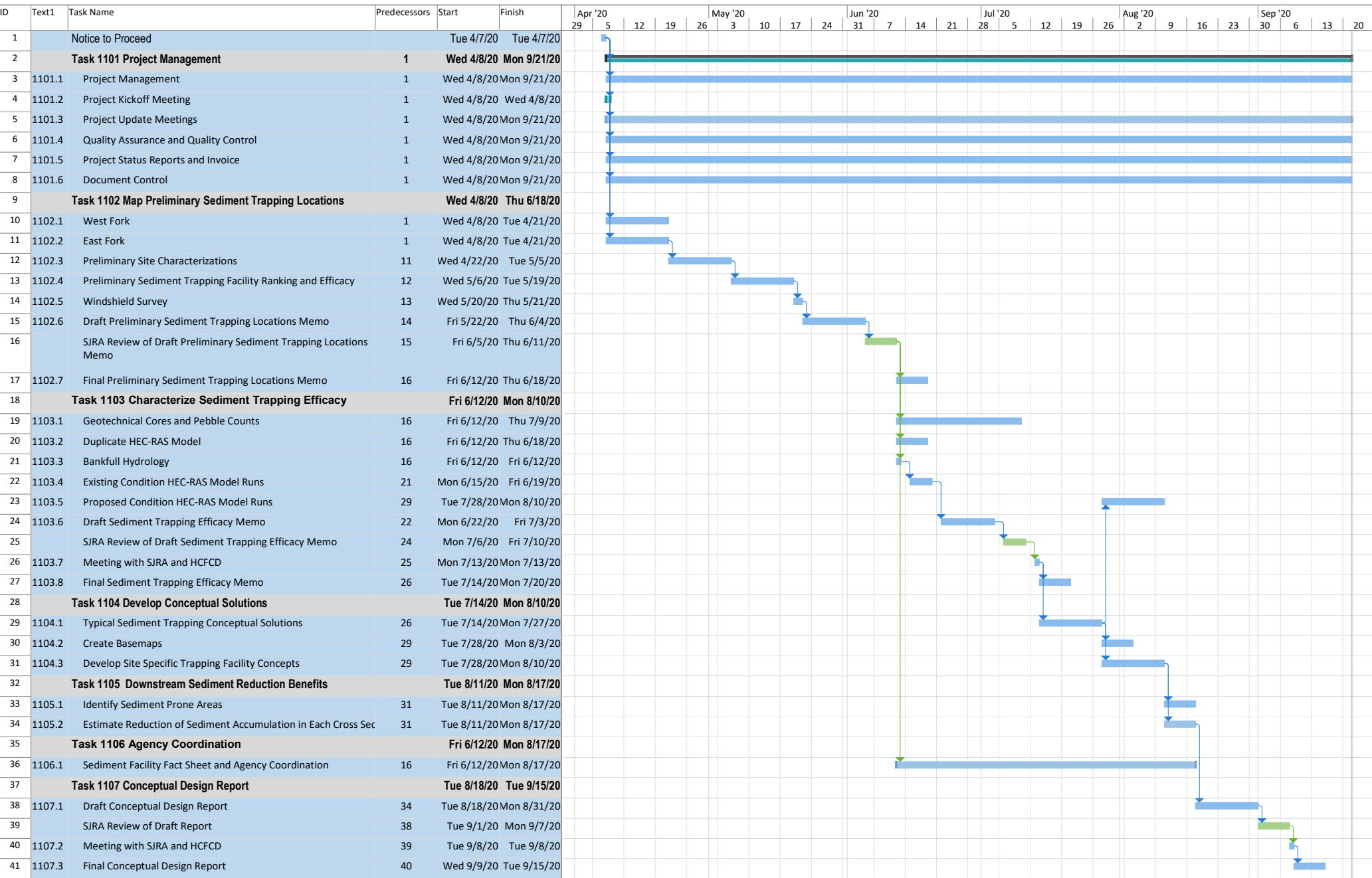
Client Name Project Name Date Detailed Cost Breakdown	Project Fee Summary	
	Basic Services	257,640
	Special Services	-
	Total Project	257,640

Tasks				Expenses										
Phase	Task	Basic or Special	Task Description	Tech Charge	Miles	Meals	Hotel	B&W (sheet)	Color (sheet)	Binding (each)	Lg Format - Bond - B&W (sq. ft.)	Lg Format - Glossy/Mylar - B&W (sq. ft.)	Other	Total Expense Effort
			Labor Multiplier											
			Base Rate											
1101			Project Management											\$ -
	1101.1		Project Management	64										\$ -
	1101.2		Project Kickoff Meeting	20										\$ -
	1101.3		Project Update Meetings	16										\$ -
	1101.4		Quality Assurance and Quality Control	28										\$ -
	1101.5		Project Status Reports and Invoice	28										\$ -
	1101.6		Document Control	6										\$ -
1102			Map Preliminary Sediment Trapping Locations											\$ -
	1102.1		West Fork	43										\$ -
	1102.2		East Fork	57										\$ -
	1102.3		Preliminary Site Characterizations	34										\$ -
	1102.4		Preliminary Sediment Trapping Facility Ranking and Effic	88										\$ -
	1102.5		Windshield Survey	28										\$ -
	1102.6		Draft Preliminary Sediment Trapping Locations Memo	114										\$ -
	1102.7		Final Preliminary Sediment Trapping Locations Memo	48										\$ -
1103			Characterize Sediment Trapping Efficacy											\$ -
	1103.1		Geotechnical Cores and Pebble Counts											\$ -
	1103.2		Duplicate HEC-RAS Model	6										\$ -
	1103.3		Bankfull Hydrology	12										\$ -
	1103.4		Existing Condition HEC-RAS Model Runs	24										\$ -
	1103.5		Proposed Condition HEC-RAS Model Runs	16										\$ -
	1103.6		Draft Sediment Trapping Efficacy Memo	52										\$ -
	1103.7		Meeting with SJRA and HCFCD	20										\$ -
	1103.8		Final Sediment Trapping Efficacy Memo	32										\$ -
1104			Develop Conceptual Solutions											\$ -
	1104.1		Typical Sediment Trapping Conceptual Solutions	36										\$ -
	1104.2		Create Basemaps	36										\$ -
	1104.3		Develop Site Specific Trapping Facility Concepts	126										\$ -
1105			Downstream Sediment Reduction Benefits											\$ -
	1105.1		Identify Sediment Prone Areas	10										\$ -
	1105.2		Estimate Reduction of Sediment Accumulation in Each C	8										\$ -
1106			Agency Coordination											\$ -
	1106.1		Sediment Facility Fact Sheet and Agency Coordination	12										\$ -
1107			Conceptual Design Report											\$ -
	1107.1		Draft Conceptual Design Report	152										\$ -
	1107.2		Meeting with SJRA and HCFCD	20										\$ -
	1107.3		Final Conceptual Design Report	56										\$ -
Total Hours / Quantity				1,192										
Total Effort				\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -

Client Name Project Name Date Detailed Cost Breakdown	Project Fee Summary	
	Basic Services	257,640
	Special Services	-
	Total Project	257,640

Tasks				Subconsultants										Total	
Phase	Task	Basic or Special	Task Description	Tim Dellapenna	Sub Name 2	Sub Name 3	Sub Name 4	Sub Name 5	Sub Name 6	Sub Name 7	Sub Name 8	Sub Name 9	Sub Name 10	Total Sub Effort	Total Effort
			Labor Multiplier												
			Base Rate												
1101			Project Management											\$ -	
	1101.1		Project Management											\$ -	\$13,582.88
	1101.2		Project Kickoff Meeting											\$ -	\$4,393.28
	1101.3		Project Update Meetings											\$ -	\$3,612.68
	1101.4		Quality Assurance and Quality Control											\$ -	\$6,261.16
	1101.5		Project Status Reports and Invoice											\$ -	\$5,916.20
	1101.6		Document Control											\$ -	\$1,255.44
														\$ -	
1102			Map Preliminary Sediment Trapping Locations											\$ -	
	1102.1		West Fork											\$ -	\$5,082.24
	1102.2		East Fork											\$ -	\$6,791.88
	1102.3		Preliminary Site Characterizations											\$ -	\$5,379.72
	1102.4		Preliminary Sediment Trapping Facility Ranking and Effic											\$ -	\$10,759.96
	1102.5		Windshield Survey											\$ -	\$5,131.32
	1102.6		Draft Preliminary Sediment Trapping Locations Memo											\$ -	\$22,251.32
	1102.7		Final Preliminary Sediment Trapping Locations Memo											\$ -	\$10,514.00
														\$ -	
1103			Characterize Sediment Trapping Efficacy											\$ -	
	1103.1		Geotechnical Cores and Pebble Counts	38,000										\$ 41,800	\$41,800.00
	1103.2		Duplicate HEC-RAS Model											\$ -	\$635.10
	1103.3		Bankfull Hydrology											\$ -	\$1,577.32
	1103.4		Existing Condition HEC-RAS Model Runs											\$ -	\$2,540.40
	1103.5		Proposed Condition HEC-RAS Model Runs											\$ -	\$1,693.60
	1103.6		Draft Sediment Trapping Efficacy Memo	4,000										\$ 4,400	\$14,197.38
	1103.7		Meeting with SJRA and HCFCD											\$ -	\$4,393.28
	1103.8		Final Sediment Trapping Efficacy Memo											\$ -	\$5,623.70
														\$ -	
1104			Develop Conceptual Solutions											\$ -	
	1104.1		Typical Sediment Trapping Conceptual Solutions											\$ -	\$6,281.72
	1104.2		Create Basemaps											\$ -	\$5,538.48
	1104.3		Develop Site Specific Trapping Facility Concepts											\$ -	\$22,997.18
														\$ -	
1105			Downstream Sediment Reduction Benefits											\$ -	
	1105.1		Identify Sediment Prone Areas											\$ -	\$1,208.92
	1105.2		Estimate Reduction of Sediment Accumulation in Each C											\$ -	\$997.22
														\$ -	
1106			Agency Coordination											\$ -	
	1106.1		Sediment Facility Fact Sheet and Agency Coordination											\$ -	\$1,512.56
														\$ -	
1107			Conceptual Design Report											\$ -	
	1107.1		Draft Conceptual Design Report											\$ -	\$30,151.20
	1107.2		Meeting with SJRA and HCFCD											\$ -	\$4,393.28
	1107.3		Final Conceptual Design Report											\$ -	\$11,166.88
														\$ -	
			Total Hours / Quantity	\$42,000.00											
			Total Effort	\$46,200.00										\$46,200.00	\$257,640.30

San Jacinto River and Tributaries Sediment Removal and Sand Trap Development - Work Order No. 1 (Conceptual Design)



Project: Schedule
Date: Mon 3/2/20

Summary	Inactive Summary	Manual Summary Rollup	Manual Summary	Manual Progress
Inactive Task	Manual Task	Manual Summary	Manual Summary	Manual Progress
Inactive Milestone	Duration-only	Start-only	Manual Summary	Manual Progress

Inactive Milestone
 Inactive Task
 Manual Task
 Manual Summary Rollup
 Manual Summary
 Manual Progress
 Start-only
 Manual Summary
 Manual Progress
 Duration-only
 Start-only
 Manual Summary
 Manual Progress
 Finish-only
 Deadline
 Progress