

PROPOSAL MEMO
VIA EMAIL

DATE: March 11, 2025
TO: Bel Marin Keys Community Service District
Attention: Vincent Lattanzio
FROM: Caitlin J. Tharp, PE, CFM
Robin J. Lee, PE, CFM
SUBJECT: Bel Marin Keys Hydrologic Study and Climate Change Resilience
Recommendations

Schaaf & Wheeler is providing you with this scope and fee to perform hydrologic and hydraulic modeling of the Bel Marin Keys Community Service District (CSD) neighborhoods inclusive of the North and South Lagoons, the overflow spill area on the South Lagoon, Novato Creek, and Pacheco Creek.

Figure 1 shows the limit of the study. It should be noted that this is a large, hydraulically connected area and requires the study of hydraulic structures, open channels, spillways, detention basins (lagoons and ponds) all under a variety of rainfall and tidal events. This scope is written in as a phased approach, understanding that costs might be prohibitive to do a comprehensive analysis at this time. In addition, there are ongoing projects with BMK Unit V and Highway 37 that also might have ongoing studies and designs.



Figure 1. Study Area

Our work will be to primarily look at optimizing the ability to release water from both the North and South lagoons through the use of the current locks, but also additional mechanisms such as the culvert connector pipe that has not been used, north lagoon sluice gates, and the high flow spill from the South lagoon to the overflow area.

Further analysis can look into the ability to use Pacheco Pond or surrounding low-lying agricultural lands to take advantage of the overall floodplain area that surrounds the BMK residents.

While this proposal aims to look at resilience needs to mitigate impacts of future rising tides, the majority of the residents within Bal Marin Keys are already in the FEMA effective mapped floodplain. This means that during a 100-yr (or the 1% chance of occurrence every year) tidal event, both lagoons are filled with water.



Figure 2. Study Area and FEMA Floodplain

This proposal can look at flood mitigation strategies, however, outboard protection in the form of levees and walls will need to be assumed. Otherwise during large storm events and high tides, the lagoons (which act as detention facilities) are all filled with water and do not provide any form of detention.

Task 1: Data Collection/Review

Schaaf & Wheeler will collect relevant data from the CSD including as-built information of the lock systems, bathymetric surveys, as-built information of the connecting culvert, North Marin Water District Stafford release data, flushing and flushing information. Schaaf & Wheeler already has the County's LIDAR (topographical data) from 2020 and storm drain pipe information from the County. In addition, Schaaf & Wheeler has some hydraulic models of the Novato Creek used for other projects and will reach out the Marin County Flood Control to see if there have been any further updates to the previous studies.

Schaaf & Wheeler will also reach out to engineers on the Highway 37 and the BMK V restoration projects to see if any models have been developed for those projects. This task include one (1) in person meeting to review the data received and discuss project objectives.

Schaaf & Wheeler will summarize the relevant data collected and any further needs in a brief memo.

Task 2: Level Sensing (optional)

Schaaf & Wheeler will deploy a level sensor in the north lagoon and south lagoon at the locks on the lagoon side. These sensors will provide Schaaf & Wheeler with detailed level information as it pertains to flushing to determine how quickly water can be released at different tide elevations. Schaaf & Wheeler will rely on the County deployed level sensor that is at the mouth or Novato Creek for the tide elevations. Sensors will also be deployed during the wet season (Oct-March) to aid in the calibration of the hydrologic model.

Staff will need to provide detailed information about lock opening and closing to line up with level sensor data to better understand the ability to release water from each lagoon at a variety of tidal elevations.

A brief tech memo will be provided with data collected and summarization of the flushing and storm events.

Task 3: Hydrologic and Hydraulic Modeling of Lagoons

Schaaf & Wheeler will prepare a hydrologic model in HEC-HMS that analyzes the volumes of runoff into the lagoons during storm events. These flows will be brought into a HEC-RAS hydraulic model to analyze the rise in water surface elevation of the lagoons based on an inch of precipitation. This will allow CSD staff to better prepare for storm events based on predicted inches of rainfall.

This HEC-RAS model will be used to determine the balance of volumes between the North and South lagoons and whether the culvert connecting pipe should be rehabilitated to allow water to flow from the North Lagoon into the South lagoon and into the overflow spill area.

Recommendations will be made based on the model to determine the feasibility of moving water from the North lagoon to the South lagoon and for the size of the culverts into the overflow area that is southeast of the South Lagoon.

Task 4: Preliminary Novato Creek Hydraulic Modeling

Schaaf & Wheeler will create a two-dimensional (2D) model of Novato Creek from Highway 101 to the mouth of the Petaluma River. This model will be used to develop a high-level outer protection measure that protects the community from both tidal flooding and riverine flooding. This model will be used to evaluate future resilience by looking at climate change impacts to precipitation and sea level rise. This study is meant to be a starting point for conversations with Marin County Flood Control and to attract grant funding.

This model will focus on up to 10-yr design storm event which is readily used to design drainage infrastructure throughout the Bay Area and look at a range of tidal boundary conditions from the mean higher high water (MHHW) and the 100-yr tidal boundary conditions.

This task will be limited to 10 scenarios to be decided upon by the CSD, however, potential solutions will only be conceptually designed to one selected scenario. Some suggested scenarios are as follows:

- 100yr Creek with MHHW (FEMA standard)
- 10yr Creek with MHHW (typical Bay Area design standard)
- 10yr Creek with King Tide
- Stafford release and 10yr storm event (this is pending data being available from North Marin Water District)
- Mid Century Climate Change 10yr, MHHW
- End of Century Climate Change 10yr, MHHW

Task 5: Recommendations

Schaaf & Wheeler will prepare a brief tech memo describing recommendations for the near term and long term. The near-term solutions will primarily focus on flushing and optimizing the way water is moved between the lagoons and the creek.

The long-term solutions will focus on the larger storm events, flood protection and climate change.

Task 6: Coordination and Project Management

Schaaf & Wheeler will be made available to the BMK CSD throughout this project via email and telephone. In addition, Schaaf & Wheeler will be available to attend one (1) Measure G meeting and up to two (2) CSD board meetings in person. This scope also includes one (1) meeting with County Flood Control District to present results and hopefully attract more funding from Flood Control to continue to hydraulic modeling effort in more detail.

Schedule and Fee

Tasks 3 and 4 are anticipated to take 12 weeks after receipt of all of the data under Task 1. Task 5 will take 2 weeks after tasks 3 and 4 are completed. Overall, we estimate this work to take approximately 4 to 5 months assuming that no level sensing is conducted.

Schaaf & Wheeler proposes to complete this work on a time and materials basis for a fee not to exceed \$54,130 without level sensing. Work will be billed in accordance with our 2025 charge rate (attached). Standard provisions dated April, 2017 (attached) apply. If you have any questions regarding this scope and budget, do not hesitate to contact me at 415-271-3117 or ree@swsv.com.

Table 1 – Project Fee

Fee Proposal		Senior Project Manager	Senior Engineer	Schaaf & Wheeler Total
		Hourly Rates	\$280	
Task 1	Data Collection/Review	8	16	\$6,320
Task 2	Level Sensing	16	40	\$14,680
Task 3	H&H Modeling of Lagoons	12	30	\$11,010
Task 4	H&H Modeling of Novato Creek	12	80	\$23,760
Task 5	Recommendations	4	16	\$5,200
Task 6	Coordination and Project Management	28		\$7,840
Labor Total w/ Sensing		80	182	\$68,810
Labor Total w/o Sensing		64	142	\$54,130

Best regards,

SCHAAF & WHEELER



Caitlin J. Tharp, PE
 Vice President
 RCE 76810

I DO HEREBY AUTHORIZE SCHAAF & WHEELER TO PROCEED FORWARD WITH THE EXECUTION OF THIS SCOPE OF WORK AS DESCRIBED HEREIN.

Name, Title

Date

Schaaf & Wheeler

CONSULTING CIVIL ENGINEERS

4699 Old Ironsides Dr., Suite 350

Santa Clara, CA 95054-1860

408-246-4848

Fax 408-246-5624

Standard Provisions

April 2017

Conditions set forth below are incorporated as part of this Agreement. These Standard Provisions and the accompanying proposal constitute the full and complete Agreement between the parties and may be changed, amended, added to, superseded, or waived only if both parties specifically agree in writing to such amendment of the Agreement. In the event of any inconsistency between these Standard Provisions and any proposal, contract, purchase order, requisition, notice to proceed, or like document, these Standard Provisions shall govern.

1. **PROFESSIONAL STANDARDS OF CARE** - Schaaf & Wheeler, its employees, subconsultants, and subcontractors (hereinafter referred to as "CONSULTANT") shall perform its services under this Agreement in accordance with the degree of care and skill ordinarily practiced at the same point in time and under similar circumstances by professionals providing similar services. No other warranty, express or implied, shall apply to the services performed by CONSULTANT.
 2. **INDEMNITY** – CONSULTANT shall indemnify and hold harmless CLIENT (including its officers and employees) against claims, losses, damages, liabilities (including the reimbursement of reasonable attorney's fees), and liability for injury or harm to persons or property to the extent caused by the negligence, recklessness, or willful misconduct of CONSULTANT for professional services performed under this Agreement. The duty to defend obligation of the CONSULTANT shall be limited to the proportionate percentage of any claim arising directly from the services performed by the CONSULTANT under this Agreement.
 3. **FORCE MAJEURE** – Neither party shall be deemed in default of this Agreement to the extent that any delay or failure in the performance of its obligations results from any cause beyond its reasonable control and without its negligence.
 4. **DISPUTE RESOLUTION** – CLIENT and CONSULTANT agree that they shall first submit any and all unsettled claims, counterclaims, disputes, and other matters in question between them arising out of or relating to this Agreement to non-binding mediation in accordance with the Construction Industry Mediation Rules of the American Arbitration Association, effective as of the date of this agreement. This provision shall survive completion or termination of this Agreement; however, neither party shall seek mediation of any claim or dispute arising out of this Agreement beyond the period of time that would bar the initiation of legal proceedings to litigate such claim or dispute under the applicable law.
 5. **APPLICABLE LAWS** – CONSULTANT shall perform its services in accordance with the laws, rules, regulations, and codes that are applicable to the project and in force at the time of the completion of the documents.
 6. **HAZARDOUS MATERIALS** - The scope of CONSULTANT's services for this Agreement does not include any responsibility for detection, remediation, accidental release, or services relating to waste, oil, asbestos, lead, or other hazardous materials, as defined by Federal, State, and local laws or regulations.
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15. PREVAILING WAGE OBLIGATIONS - The Client shall notify Schaaf & Wheeler in writing if the Work contemplated by this Agreement constitutes a "public work" under any and all federal, state and/or local prevailing wage laws, and/or living wage laws, including but not limited to the Davis-Bacon Act and the provisions of California Labor Code §§ 1720 et seq. In the event that Schaaf & Wheeler must adhere to federal, state and/or local prevailing wage obligations for the Work performed, the Client shall notify and provide Schaaf & Wheeler with any and all applicable prevailing wage determinations prior to the Work to being performed under this Agreement. Any prevailing wage obligations might affect the payment terms contemplated by this Agreement and thus constitute a changed condition mandating renegotiation and/or termination of this Agreement. The Client understands and agrees that Schaaf & Wheeler will rely on the representations made by the Client with regard to prevailing wage obligations and the Client agrees to indemnify Schaaf & Wheeler, its officers, directors, employees, agents and/or subcontractors against any and all claims, liabilities, suits, demands, losses, costs and expenses, including but not limited to reasonable attorney's fees and legal costs, arising from Schaaf & Wheeler's reliance upon the Client's representations regarding prevailing wage obligations.

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408-246-4848

Hourly Charge Rate Schedule

Personnel Charges

Charges for personnel engaged in professional and/or technical work are based on the actual hours directly chargeable to the project.

Current rates by classification are listed below:

<u>Classification</u>	<u>Rate/Hr</u>
Principal Project Manager	\$305
Senior Project Manager	\$280
Senior Engineer	\$255
Associate Engineer	\$225
Assistant Engineer	\$205
Junior Engineer	\$190
Designer	\$180
GIS Analyst	\$180
Technician	\$165
Engineering Trainee	\$140

Litigation Charges

Court or deposition time as an expert witness is charged at \$500 per hour.

Materials and Services

Subcontractors, special equipment, outside reproduction, data processing, computer services, etc., will be charged at 1.10 times cost.

Effective 1/1/25

From: Robin Lee <RLee@swsv.com>

Date: March 12, 2025 at 3:17:23 PM PDT

To: "Vincent P. Lattanzio" <vlattanzio@bmkcsd.us>

Cc: Vincent Lattanzio <vince@carducciassociates.com>, Brian Clark <bclark@bmkcsd.us>, Lisa Lue <llue@bmkcsd.us>, Steve Nash <snash@bmkcsd.us>

Subject: RE: Bel Marin Keys Hydrologic Study and Sea Level Rise Analyses

I reached out to County H&H guy today and they are already doing some 2D modeling of Novato Creek area for the highway 37 project. Basically – they took a model that S&W prepared a while ago and have made updates to the 2019 LIDAR. The model intention is not flood control for BMK and it doesn't appear that they are making recommendations for flood protection, but it certainly is an effort that S&W can build upon.

It might make sense to focus on the lagoon hydrology for now, and wait on the full Novato Creek modeling once the County's model is available. Will save some effort on the CSD's part. I don't know exactly how much effort saved until I get eyes on the model and review it in detail.

Robin J. Lee, PE, CFM | Senior PM

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