County of Santa Barbara
Purchasing Agent
260 N San Antonio Rd,
Santa Barbara, CA 93110

Order CN4850

Order date
5/11/2023

Delivery address
Santa Barbara County
PW ROADS, ACCTG
123 E. ANAPAMU ST, STE 205
SANTA BARBARA, CA
93101

805-568-3003

Vendor
756596
NICHOLS CONSULTING ENGINEERS CHTD

1885 S ARLINGTON AVE STE 111
RENO
NV
89509
DEBRA G SMITH CFO
DSMITH@NCENET.COM

Bill To
Santa Barbara County
123 E. ANAPAMU STE 205 SANTA BARBARA, CA 93101 805 568-3003

Refer Inquiries to Buyer
Christian Garcia
cgarcia@countyofsb.org

Terms of payment
30 days

Item/Comments	Description	Preferred delivery date	Quantity	Unit	Price	Amount
000432-CONSULTANT, AUTOMATION	Proposal to provide services to evaluate the impacts of utility cuts and refuse collection trucks/heavy construction vehicles on the County's road network and pavement management. Cost is $120,000.00 - (see Cost Estimate page 21). Sample City Council/Board letter included - used at other agencies.	2024-06-30	1.00	Lot	120,000.00	120,000.00

Order Total USD **120,000.00**

GENERAL: Contract to provide professional consulting services to evaluate the impacts of utility cuts and refuse collection trucks/heavy construction vehicles on the County's road network as per attached Nichols Consulting Engineers CHTD proposal dated May 3, 2023.

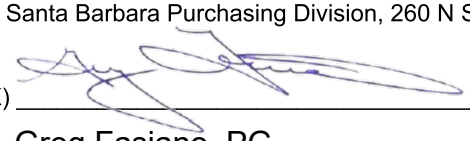
CONTRACT PERIOD: Start date, as directed. Termination date, as directed and NO LATER THAN 06/30/2024.

LIMITATIONS: Total expenditure for the period shall not exceed $120,000.00. Any increase or decrease in this total amount may be authorized only upon written notice from the County Chief Procurement Officer.

STANDARD TERMS AND CONDITIONS FOR INDEPENDENT CONTRACTORS (ver. 2023 02 06) attached.

THIS CONTRACT IS NOT VALID FOR AMOUNTS IN EXCESS OF TWO HUNDRED THOUSAND DOLLARS ($200,000)

NOTE TO CONTRACTOR: No payment will be due or payable unless this contract is properly executed and returned to the County Purchasing Office. Do not commence performance until you have executed this contract and returned it to the County of Santa Barbara Purchasing Division, 260 N San Antonio Rd, Santa Barbara, CA 93110.

Accepted By: (X) 

Print Name/Title: Greg Fasiano, PG
Vice President & Secretary Date: 5/16/23

Applicable License # (Medical/Contractor/Etc.):_____

Phung Loman
COUNTY OF SANTA BARBARA

May 3, 2023

Mr. Scott McGolpin
Director of Public Works
County of Santa Barbara
Public Works Department
123 East Anapamu Street
Santa Barbara, CA 93101
Proposal sent via email to: mcgolpin@countyofsb.org

Proposal to evaluate the impacts of utility cuts and refuse collection trucks/heavy construction vehicles on the County's road network.

Dear Mr. McGolpin,
NCE is pleased to present the County of Santa Barbara (County) with this letter proposal to provide professional consulting services to evaluate the impacts of utility cuts and refuse collection trucks/heavy construction vehicles on the County's road network.

NCE has extensive experience performing similar pavement-related studies for public agencies throughout California and the U.S. We are a nationally recognized pavement specialty firm with broad capabilities and expertise in the areas of pavement management, research, analysis, and design, and we bring to the County of Santa Barbara the following:

- **National Expertise in Pavement Technology** – NCE is a unique civil engineering firm in that we have a pavement research division that conducts applied research and engineering studies for the Federal Highway Administration and state highway agencies.
- **Performed Truck Impact Fee Studies** for the Cities of Pacifica, Elk Grove, Walnut Creek, San Bruno, Highlands, San Joaquin Irrigation District, and UC Davis.
- **Performed Utility Cut Impact Fee Studies** for the Cities of Anaheim, Pacifica, Davis, Ukiah, and Sacramento. Additionally, NCE performed studies on the impact of utility repairs on the performance of street pavements for the Cities of Palo Alto, Chico, Bishop, and Salem, as well as for the County of Santa Clara and the Cities of Las Vegas, North Las Vegas, Henderson as well as Clark County in Nevada.
- **Local Experience** – NCE has extensive experience in California, and we have worked for more than 200 cities/counties across California on pavement-related engineering projects, including the County of Santa Barbara.
- **Rigorous Quality Control** – NCE's projects include a QC Manager, who reports directly to the Project Manager and provides a thorough review of documents prepared for deliverables.

- **Local Regulatory Requirements** – The NCE team proposed for this project has comprehensive knowledge and experience with the Counties, Caltrans, and Greenbook engineering standards, requirements, and guidelines.

Finally, we would like again to emphasize the uniqueness of NCE's qualifications and experience. We are a pavement specialty firm with a depth of knowledge that extends from research and studies to evaluation and design. Our clients range from the Strategic Highway Research Program (SHRP) to state highway agencies, such as Caltrans, to local cities and counties. We perform state-of-the-art pavement research and analysis, and we are able to convert the results into practical solutions for local implementations including impact fee studies.

NCE has the capability to deliver responsive, cost-effective, and high-quality pavement engineering and management services. These services will be accomplished through a systematic and organized method of work and communication led by NCE's proposed Project Manager Mr. Vivek Jha, MS, PE. Mr. Jha will be the contact for all correspondence for this proposal. As an Associate/Operations Manager, Mr. Jha is authorized to sign contracts on behalf of NCE. His contact information is as follows:

Authorized to Bind Company and Proposal Contact
Mr. Vivek Jha, PE
Associate/Operations Manager
Phone: (909) 362-7936
Email: VJha@ncenet.com

NCE Project Office
17050 Bushard Street, Suite 200
Fountain Valley, CA 92708
Phone: (714) 848-8897
Website: www.ncenet.com

NCE is truly excited about this project. We look forward to your favorable review of our proposal and the opportunity to work again with the County of Santa Barbara.

Sincerely,
NCE

Vivek Jha, MS, PE
Associate/Operations Manager

FIRM PROFILE

Nichols Consulting Engineers, CHTD. (NCE) is a client-focused professional consulting firm integrating the disciplines of engineering, science, and planning to address the infrastructure and resource challenges facing our communities today and in the future. NCE has progressed significantly in expertise and capabilities beyond its origin as a transportation research and pavement management firm working with the Federal Highway Administration (FHWA). Unique from other civil engineering firms, we have specialized in pavement technology, including pavement management, design, and research, for more than three decades.

NCE's Strengths:

- Extensive experience and strong working knowledge of **impacts of utility cuts and heavy vehicles on pavement performance**
- State-of-the-art field testing capabilities
- Pavement data analysis and performance modeling
- Development of pavement performance models
- Development of impact fees

We have performed pavement condition surveys ranging from state highways in 12 states to local street networks in over 200 cities and counties in California. We have surveyed over 100,000 miles of pavements, including alleys and parking lots. Our field data collection ranges from walking surveys as per the ASTM D6433 protocols to using specialized automated equipment to collect data such as pavement distresses, roughness, structural strength (deflection testing) to asset data (signs, signals, curb ramps, marking, sidewalks, etc.). Our services include pavement evaluation, testing and design, civil engineering, and the research and design of sustainable and innovative pavement technologies.

NCE was established in 1990, and we have since grown to over 129 employees in seven offices throughout California and Nevada. More than 85% of NCE's revenues come from local, state, and federal agencies providing NCE with an in-depth understanding of current regulations, policies, and procedures, as well as best practices. **Services for this contract will be primarily provided from our Fountain Valley office.**

FIRM QUALIFICATIONS

NCE's civil engineers and technicians are experienced in collecting pavement distress data, analysis, and design, as well as developing plans, specifications, and construction cost estimates for infrastructure projects. Our team has extensive experience with state and local design standards and is familiar with both Caltrans pavement design standards and Standard Specifications as well as the APWA Standard Specifications for Public Works Construction "Greenbook". The County of Santa Barbara can count on our team to provide superior, responsive service on this project. Our fundamental goal is to produce high-quality work products while maintaining a reputation for timely service. NCE provides a wide range of core capabilities and services to our clients including those listed below:

- Asset/Pavement Management
- Pavement Testing, Analysis, and Design
- Civil Engineering Design
- GIS and Database Management
- Pavement Rehabilitation and Sustainability
- Deflection Testing and Coring
- Complete Streets and ADA Retrofit Design
- Landscape Architecture/Green Infrastructure
- Environmental Studies and Documents
- Regulatory Compliance and Permitting
- Sustainable Design/Low Impact Development
- Construction Documents (PS&E)
- Construction Management/Inspection
- Utility Relocation Design
- Hydrology and Hydraulic Analysis
- Stakeholder Facilitation/Public Outreach.

Pavement Evaluation – Pavement evaluation, analysis, and design are NCE's specialty. We offer unrivaled experience and expertise with pavement treatment alternatives. We have designed thousands of roads and trails throughout California and Nevada. Our expertise in pavement treatment alternatives includes, but is not limited to, cost saving, cutting edge, and green/sustainable paving technologies, such as warm mix asphalt and in-place recycling technologies. We consider many factors during pavement evaluations, including cost, performance, future maintenance, traffic, access, pavement section properties, geometric constraints, and climate, including shaded areas and drip lines.


Coring

Additional Funding for Pavement Maintenance. NCE has helped various agencies to secure supplementary funding for pavement maintenance through innovative sources, including waste vehicles and trench cut impact fees. The repeated collection of waste and underground utility maintenance services can lead to pavement degradation, incurring an equivalent cost for damage. NCE has assisted these agencies in quantifying the damage caused by waste vehicles and trench cuts on the pavement, quantifying a cost that can then be levied against waste and utility companies as impact fees. NCE has also supported these agencies in getting the impact fees approved by City Councils/Board of Supervisors.

Specialty Pavement Testing – NCE has unique capabilities which can provide the County with expertise in Falling Weight Deflectometer (FWD) testing, ground penetrating radar (GPR), coring, and GIS data collection:

- NCE can evaluate pavement structural conditions with non-destructive testing using NCE's Dynatest Model 8000 FWD. The in-situ conditions can be quickly evaluated to determine issues such as the extent of subgrade problems or the presence of voids/unstable soils.
- NCE can evaluate the existing asphalt, base materials, and subgrade materials using NCE's core rig.
- NCE can collect GPR data for the entire street network. GPR is a non-destructive way to obtain a continuous asphalt concrete (AC) thickness profile.


FWD


GPR

PROJECT UNDERSTANDING

NCE understands that the County of Santa Barbara is seeking professional consulting services to assist in evaluating the impacts of utility cuts and refuse collection trucks/heavy construction vehicles on the County's road network.

Over the past few decades, the number of refuse collection trucks servicing County roads has increased. What used to be a once-weekly refuse truck is now multiple different vehicles (waste, recycling, green waste/organics). The increased number of refuse trucks is causing increased damage to pavements (Figure 1). In addition, as new developments are being added to the county's network (commercial or residential), the impact of heavy construction vehicles can be detrimental to pavement performance.

Additionally, utility companies often need to cut existing pavements to access and service their underground equipment. Ideally, all underground utility maintenance would be performed prior to pavement rehabilitation or reconstruction so that new pavement structures are not cut. However, despite the best coordination, cuts cannot always be avoided; unanticipated work is often required to maintain essential public services.

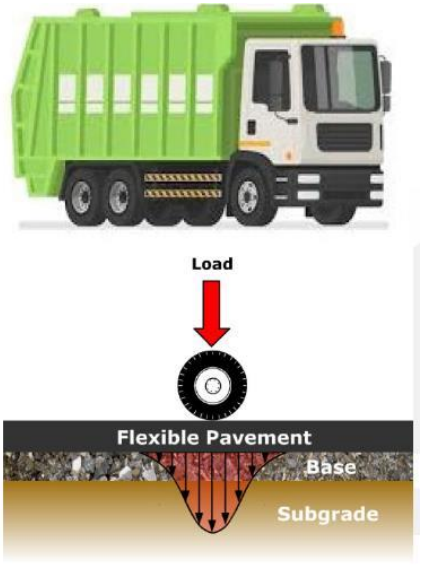


Figure 1. Vehicle Impact on Pavement

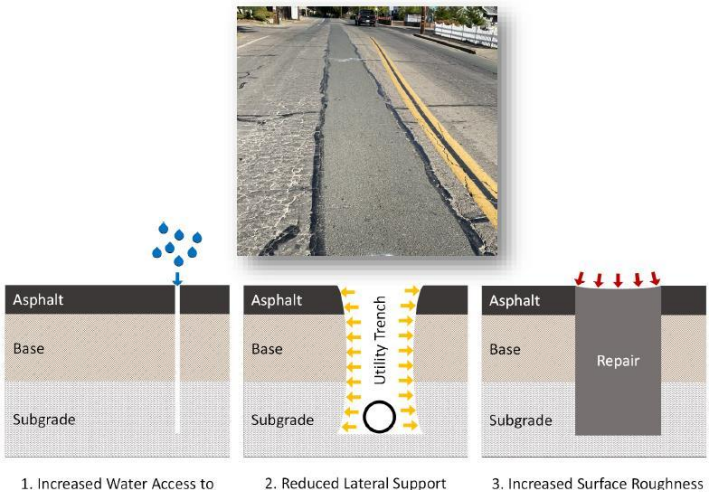


Figure 2. Utility Cut Impact on Pavement

Public agencies and utility companies have been investigating the impact of the cuts on pavement performance for over 30 years, with the goal of quantifying the impact on roads and estimating the corresponding financial impacts (Figure 2). To really understand the impacts of the cuts on roadway performance for a particular agency, a site-specific study, and analysis must be performed.

The County desires to quantify the damage caused by the cuts and refuse collection trucks/heavy construction vehicles on the pavement in terms of service life and quantify the damage from a cost perspective.

Key Assumptions

Based on our experience from past impact fee studies and in order to determine the most appropriate strategy for the County, we have made the following key assumptions.

NCE has assumed that the County will be able to provide the following:

- Access to the StreetSaver® database
- Annual budget or Pavement Condition Index (PCI) goal

- Typical layer pavement thickness
- Traffic Index based on functional classification
- Heavy vehicle types, axle distribution, and frequency
- Heavy vehicle hauling routes
- Locations of the cuts, which would include different age-groups and across all functional classifications

NCE has conducted similar site-specific impact fee studies for the Cities of Anaheim, Pacifica, Ukiah, Davis, Sacramento, and Elk Grove. The purpose of these studies was to estimate the damage to the pavements caused by the cuts and heavy vehicles, develop a fee schedule to recover the costs associated with such damage and compare the recommended fee schedule with typical fees charged by similar California agencies.

To accomplish the objectives above, the following scope of services is proposed.

SCOPE OF WORK

Task 1 – Kickoff Meeting and Project Management

NCE will first meet with County staff to kick-off the project by reviewing the technical approach and any administrative matters that may be necessary. At a minimum, items to be discussed will include the following:

- Project goals
- Scope of work, project schedule, budget, and invoicing requirements
- Communication channels and protocols
- Information needed from the County
- Other items as needed.

Prior to the kick-off meeting, NCE will prepare a detailed agenda which will be sent to the County staff for review prior to the meeting. This task assumes one kick-off meeting and two progress meetings. It is assumed that meetings will be held virtually.

Deliverables for Task 1:

- Agenda and technical memorandum summarizing the results of meeting.

Task 2 – Vehicle Impact Fee Study

The purpose of this study is to assess the structural and financial impact of refuse collection trucks or other heavy vehicles on roads in the County.

2A Data Collection

NCE will coordinate with County staff to obtain the necessary information and assumptions to perform a comprehensive refuse collection/heavy vehicle impact study. The required information includes:

- Pavement condition breakdown by functional class
    - Previous PMP Reports
    - Access to County's PMP database
- Pavement structural data for the roads under investigation
    - Typical asphalt thickness, aggregate base thickness, and R-values
- Design Traffic Index (TI)
- Waste vehicle type and frequency
    - Waste vehicle axle configurations
    - Full and Empty Gross Vehicle Weight (GVW)
    - Number of truck types (garbage, green waste, recycling, organics, bulky waste, etc.) and
    - Hauling routes
- Financial component
    - County's long-term maintenance goals (existing annual budget or budget to meet PCI goal)

This task assumes that one virtual progress meeting will be held with County staff to coordinate the collection of the necessary information and assumptions.

2B Impact Analysis and Develop Fee Schedule

Once all relevant data is collected, NCE will perform an impact analysis combining methods from the Caltrans Highway Design Manual and the AASHTO Pavement Design Guide. Ultimately, the analysis compares the estimated traffic demand associated with refuse/heavy vehicles to the average remaining structural capacity of the County's roads to estimate the percent of life used each year by refuse vehicle type and incorporates the financial component to obtain an average equivalent damage cost per year.

2C Draft and Final Reports

Once the results of the study are finalized, NCE will prepare and provide a draft report to the County summarizing the assumptions, technical approach, and results of the study. Upon receipt of the County's comments on the draft reports, final reports will be completed and submitted to the County.

Deliverables:

- Draft and Final Report (electronic)

Task 3 – Utility Cut Impact Fee Study

The impact of the cuts can be evaluated using two approaches: a historical evaluation using the PMS database and a field evaluation testing actual sites.

- Historical evaluation includes analysis of functional damage on the pavement due to cuts using inspection data and rehabilitation history from the StreetSaver database.
- Field evaluation includes the analysis of both functional and structural damage on pavement caused by cuts based on the existing site with cuts.

While the historical evaluation includes analysis of hundreds of data points from the past, the field evaluation includes analysis of approximately 24-30 data points based on present existing sites with cuts. Marrying these two evaluation approaches will yield a robust fee schedule that accounts for both functional and structural damage based on past and present circumstances.

3A Historical Evaluation

Under this task, NCE will analyze the County's historical pavement inspection data in the StreetSaver® database and compare characteristics of road sections with and without cuts to evaluate impacts on pavement service life due to cuts.

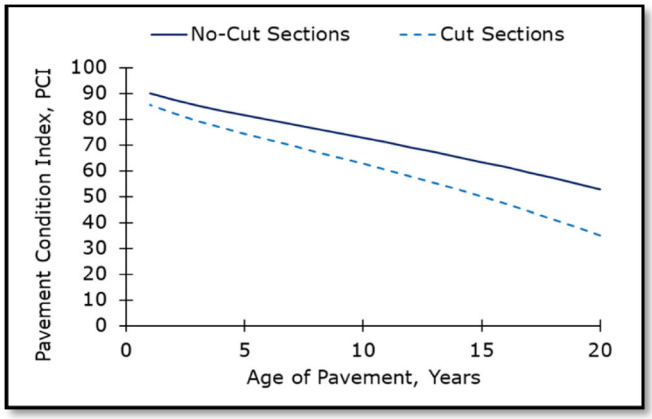


Figure 3. Pavement Deterioration Curve for Cut and No-Cut Sections (City of Pacifica)

The County's StreetSaver® database contains inspection data dating to 1999 and historical maintenance and rehabilitation records dating back to 2000. This robust database is expected to provide over 500 sample units with or without cuts that can be used for the analysis. A rehabilitation date will be used to determine the pavement age at the time of the cut.

Consequently, NCE will review the County's StreetSaver® database to extract sections with cuts and compare their PCIs before and after the cuts for different age-groups, functional classifications, and condition categories. Pavement deterioration curves of cut and no-cut sections will be developed using the historical data from the County's database like Figure 3. The pavements with cuts are expected to deteriorate faster compared to the pavements without cuts. The results will be summarized and used to develop a fee schedule in Task 3C.

3B Field Evaluation

A field evaluation of a minimum of 24 sites containing cuts on roads of different functional classifications and pavement ages will be conducted. For each site, a pair of 100-ft sections (one with cut and one without cut) will be evaluated using field testing and a PCI survey to assess the impact of cuts on the pavement. Deflection testing will be conducted at the sites on both sections using a falling weight deflectometer to assess the loss of structural capacity due to the presence of cuts. A PCI survey will be conducted on the pair of sections within the selected sites to assess the functional damage.

Figure 4. Examples of Site Selection

3B.1 Site Selection

This task will require interaction with the County staff, as NCE will have to review the sites provided and select appropriate sites for testing. Our cost estimate assumes a total of 24 test sites; each site will have a section with a cut and one without a cut (Figure 4) for comparison.

NCE will mark a total of 54 sections with and without cuts (27 test sites) with white paint in the field. The additional 3 sites will be marked as optional if field testing cannot be performed on any of the first 24 sites.

3B.2 Structural Analysis

Deflection testing will be conducted along the cut, 2 feet away from the cut (known as the zone of influence) as well as on the section with no cuts (see Figure 4). The premise is that cutting into a pavement will structurally weaken the surrounding areas due to the "slumping" effect. Figure 5 shows the trend where deflections are higher on the cut and near the cut compared to the section without the cut.

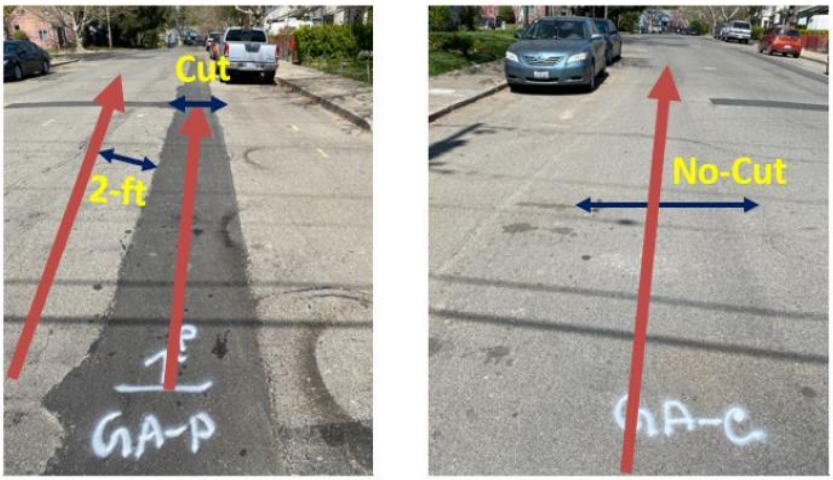


Figure 4. Falling Weight Deflectometer (FWD) Testing Layout

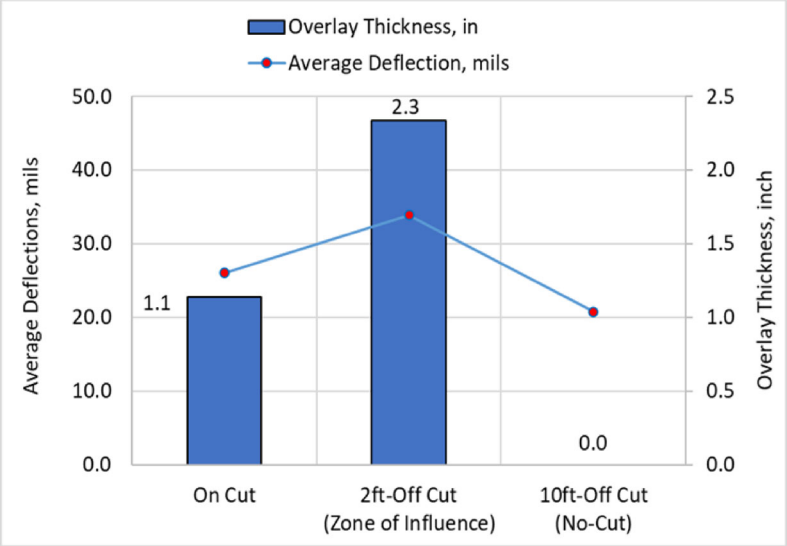


Figure 5. Expected Deflection and Overlay Thickness Trend

Deflection testing can be used to establish the relative loss of structural capacity resulting from the presence of pavement cuts. This loss of structural capacity necessitates thicker overlays, thus increasing the cost of rehabilitation for a street with cuts over a street with no cuts. The calculation of overlay thickness will require actual existing pavement thickness which will be obtained through cores.

Figure 5 shows that the pavement adjacent to the cut has a higher overlay thickness required than the section with no cut. By comparing the costs of overlays for sections with and without cuts, the increased cost attributable to the cut can be assessed.

3B.3 PCI Survey

In this task, NCE will conduct PCI walking surveys using the using the Metropolitan Transportation Commission (MTC) modified[1] ASTM D6433[2] survey procedures on each field site. The differences in PCI between the sections with and without cuts will be evaluated for functional damage.

3C Develop Fee Schedule

Since cuts can cause damage to pavements structurally and functionally, both types of evaluations are crucial in developing a fee to compensate for appropriate damages. NCE will next develop a fee schedule using both approaches (historical and field investigation) that will recover the impact of cuts for the County. Typical costs of repairs and types of repairs will be obtained from the County and will be used to develop the fee. This should be from recent bid tabs and include cost data such as:

- Construction and construction management of pavements
- Design
- Agency overhead costs
- Non-pavement items such as striping, traffic control, signal loops etc.
- Other costs as appropriate

3D Draft and Final Reports

Upon completion of the analysis, NCE will prepare a draft study report for the County to review. Upon receipt of the comments on the draft report, NCE will complete the final report for submittal. The report will include the following:

- Introduction/background
- Results of literature review
- Technical approach
- Results of structural analysis
- Results of functional analysis
- Strategy for developing fee
- Recommendation and implementation of fee
- Comparison of results with other studies

Deliverables

- Draft and Final Report (electronic)

[1] PCI Distress Identification Manuals (AC 4th Edition, PCC 3rd Edition), Metropolitan Transportation Commission, San Francisco, CA March 2016.
[2] ASTM D6433-18 Standard Practice for Roads and Parking Lots Pavement Condition Index Surveys, ASTM International, West Conshohocken, PA 2018, astm.org.

Task 4 – Presentation to Board of Supervisors (OPTIONAL TASK)

NCE will assist the County in presenting our findings to the Board of Supervisors. This will include the methodology employed, a discussion of alternatives, and recommendations. Prior to the workshop, NCE will meet with County staff to review the presentation and modify it as needed.

NCE has conducted many similar presentations, both to a technical and a non-technical audience. Typically, audiences such as a technical advisory committee will "dive deep" into the technical details. In contrast, County Council may focus only on the policy recommendations. Either way, NCE will provide County staff with the support desired.

Deliverables

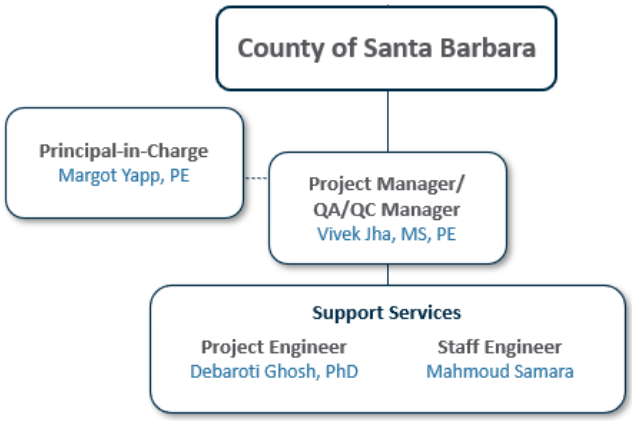
- PowerPoint Presentation

PROJECT TEAM

NCE brings a collaborative and innovative problem-solving mentality to address the technical challenges facing the County's pavement issues. Our key personnel have worked together on dozens of projects. The single most important tool for successful project management is clear, consistent, and cooperative communication. As Project Manager, Vivek Jha, MS, PE, will communicate regularly with the County regarding the study's progress. Vivek is knowledgeable of the technical resources in the firm, manages and provides quality control for engineering projects, understands public sector contracts and contracting, and has the authority to recruit resources within the firm and will work closely with the team and the County to make resources available on a short order basis. He will work closely with the team and the County to apply new ideas grounded in results gained to date from previous trench cut impact studies.

We have assembled a team of professionals with demonstrated experience providing services for similar types of programs – people who will take an outside-of-the-box approach to problem-solving and can draw upon established and new technologies to develop solutions. Our staff benefits from an investment in continuous training in emerging design and construction techniques and routinely shares their technical knowledge with others in the engineering community through teaching seminars, workshops, and publication of articles in professional journals. The NCE Team and communications structure are presented in Figure 6 and corresponding resumes detailing our team's experience are in Appendix A.

Figure 6. Project Organization Chart



AVAILABILITY AND CAPACITY TO PERFORM REQUESTED SERVICES

The NCE team has the depth of resources available to complete the necessary work and meet the deliverable milestones. Our key personnel identified in this proposal have the capacity and availability required for the duration of this contract. These individuals will be ready to begin work upon notice to proceed from the County. **NCE is committed to providing the proposed key and support personnel presented within this section; key personnel will not be substituted without prior approval from the County.**

PROJECT EXAMPLES WITH REFERENCES

NCE has had the privilege to work with many cities and counties in California, including the County of Santa Barbara. The following pages provide relevant project examples that NCE has successfully delivered to our clients. These projects exemplify our firm's diverse range of experience and capabilities that we can provide to the County. In addition, the individual and agency references provided with each project example will allow the County to verify NCE's experience and the level of satisfaction of our repeat clients.

Trench Cut Fee Study for the City of Anaheim, CA

Contracting Agency:
City of Anaheim Public Works Department/Engineering
Address:
200 South Anaheim Blvd.
Anaheim, CA 92805
Contact:
Carlos Castellanos, PE
City Engineer
Phone:
(714) 765-5066
Email:
CCastellanos@anaheim.net

Project Scope: NCE was selected by the City of Anaheim to provide a Trench Cut Fee Study for the City's streets. The City was looking into ways to recover both its direct and indirect costs through fees, and desired to evaluate the impact of pavement cuts on the structural integrity of asphalt concrete streets. The City owns and maintains approximately 581.73 centerline miles of pavements, which includes 156.57 centerline miles of the Master Plan of Arterial Highways (MPAH) streets (AHS network) and 425.16 miles of local streets (LSS network).

NCE's responsibilities included developing a Preliminary Study Report (PSR), Study Workshop, Final Study Report, as well as providing Outreach and Coordination (Council and Fee Workshops, study development meetings, and public meetings).

NCE's scope of work included the following tasks:

- Research and summarize other studies related to street deterioration and rehabilitation costs from pavement utility cuts and trenches;
- Determine a methodology to establish the impacts of utility cuts/trenches;
- Perform a comprehensive pavement analysis to determine the extent of damage to the City's streets;
- Determine the loss of street life as a result of pavement cuts and determine the resultant rehabilitation costs;
- Develop an impact fee schedule relative to pavement cuts;
- Conduct a study workshop;
- Provide public outreach support;
- Prepare a study report

Vehicle Impact Fee for the City of Elk Grove, CA

Contracting Agency:
City of Elk Grove Public Works Department
Address:
10250 Iron Rock Way
Elk Grove, CA 95624
Contact:
Robert French
O&M Operations Supervisor
Phone:
916.478.3648
Email:
rfrench@elkgrovecity.org

Project Scope: The City of Elk Grove selected NCE to implement a vehicle impact fee for the damage done to the City's residential streets resulting from a new weekly organics refuse collection. The City had weekly garbage and bi-weekly recycling and green waste collection and desired to recapture funds from the vendor with the goal of putting the money back into street maintenance and rehabilitation.

The City documented that extra organics refuse truck traffic accelerated the damage and shortened the life of the City's residential streets and funds were/are needed to maintain them. NCE assisted the City in determining the pavement damage and the associated vehicle impact fees.

NCE's scope of work included the following tasks:

- NCE reviewed documentation and related information submitted by the City as the first step in this process:
  - Pavement structural designs and specifications for the residential streets under investigation.
  - Refuse vehicle traffic – number and frequency along with an estimation of other typical truck traffic.
  - Refuse vehicle routes for traffic estimation.
  - City traffic indexes (TIs) for the streets.
  - Typical maintenance practices – types and frequencies.
  - City M&R expenditures for residential streets.
- NCE provided a final report to the City that included a method to calculate the impact fee based on the added traffic.
  - Estimated the current/typical ESAL traffic on the residential streets of interest.
  - Estimated the ESAL traffic due to the additional refuse vehicles.
  - Assessed the total maintenance and rehabilitation (M&R) costs for the residential streets due to all traffic based on City records.
  - Apportioned the cost of M&R due to the refuse ESALs.
  - Developed an ongoing fee to cover the additional M&R costs.

Utility Cut and Vehicle Impact Fee Studies for the City of Pacifica, CA

Contracting Agency:
City of Pacifica Public Works Department
Address:
155 Milagra Drive
Pacifica, CA 94044
Contact:
Lisa Petersen, PE
Public Works Director
Phone:
(650) 738-3770
Email:
petersenl@ci.pacifica.ca.us

Project Scope: NCE was selected by the City of Pacifica to evaluate the impact of utility cuts, heavy construction vehicles, and refuse collection trucks on the City's street network and to develop appropriate measures, including a fee study.

NCE's performed the following tasks:

- Reviewed existing information on pavement sections.
- Reviewed current restoration standards and practices.
- Reviewed historical data available such as age of trenches and pavements, and maintenance and rehabilitation activities.
- Reviewed previous study report and approaches.
- Reviewed typical maintenance and rehabilitation practices and costs.

- Reviewed existing maintenance and pavement cut record-keeping procedures.
- Determined the financial impact of the waste/refuse collection vehicles on the City's Street network.
- Developed a heavy construction vehicle and utility cut impact fee.

ADDITIONAL RELEVANT PROJECTS

Impact of Utility Repairs of Street Pavements for Various Cities and Counties, CA and OR

Contracting Agency:
Various Cities and Counties, CA and OR

Project Scope: NCE has or is performing Utility Cut Studies for various cities such as the Cities of Ukiah, Davis, Sacramento, Chico, Bishop, and Salem, OR, as well as for the County of Santa Clara, CA. Deflection testing was utilized to determine the impacts of utility cuts, and fee schedules were developed. These agencies did not possess sufficient historical data in their pavement management systems; and therefore, deflection testing was the only approach available. NCE also reviewed typical maintenance and rehabilitation practices and costs.

Technical Review of Pavement Maintenance Impact Study for the City of Santa Rosa, CA

Contracting Agency:
City of Santa Rosa
Transportation and Public Works Department
100 Santa Rosa Avenue
Santa Rosa, CA 95404

Project Scope: The City of Santa Rosa had developed a methodology to determine the impacts of refuse trucks and underground utilities on pavement life. Pavement management data was used to model the differences in pavement life depending on the presence of utilities. Most approaches used by other agencies focus specifically on utility cuts, and employed deflection testing and mechanistic analysis to quantify the impacts on pavements. These are then translated into fee schedules that are usually tiered (typically by age or condition), and then applied to all utilities that make cuts.

In the case of Santa Rosa's Utility Impact Fee (UIF), some of the assumptions relied on engineering judgment and local observations from the field when originally developed in 2003. NCE was selected to perform a peer review of the assumptions used such as the impact of refuse trucks and utilities, as well as the life extensions of the designated maintenance treatments and the development of the impact fee. Recommendations were made to update the models with field data as well as to revise the cost assumptions for the impact fees.

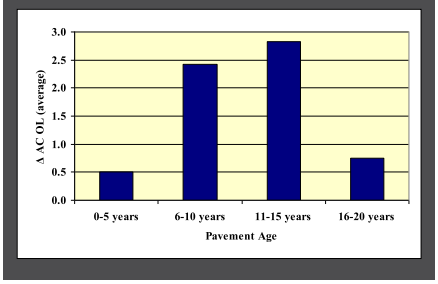
Evaluation of Pavement Cuts for the Regional Transportation Commission of Southern Nevada

Contracting Agency:
Regional Transportation Commission of Southern Nevada
600 S. Grand Central Pkwy.
Suite 350
Las Vegas, NV 89106

Project Scope: NCE investigated the impacts of pavement cuts (from utilities as well as street maintenance) on streets within the Cities of Las Vegas, North Las Vegas, Henderson as well as Clark County. This project objective was to determine if there was an impact on pavements from the presence of pavement cuts, and if so, to quantify that impact and the costs for restoration. In this study, we performed the following:

- Reviewed and summarized other studies related to street deterioration and rehabilitation costs from pavement cuts.
- Conducted a testing program to evaluate pavement sites in all agencies affected by cuts. This included deflection testing with a Falling Weight Deflectometer in order to assess the structural differences.
- Performed a comprehensive pavement analysis to determine the extent of damage to County/City streets from pavement cuts.
- Determined the loss of street life as a result of pavement cuts and rehabilitation costs.
- Developed a fee schedule or methodology to recover rehabilitation costs and a fee schedule.
- Recommended restoration procedures to mitigate the impacts of pavement cuts.

NCE's general approach was to perform a structural evaluation using deflection testing. Once the results indicated that there were



statistical differences present, a model was developed to predict the differences in maintenance and rehabilitation costs resulting from a pavement cut.

As the results indicated in the figure to the left, pavements that were 11-15 years old were impacted greatest (as measured by the increase thickness of an asphalt concrete overlay) by the presence of utility cuts. Numerous presentations were made to RTC staff during and at the conclusion of this study.

Impact of Utility Cuts on Street Performance for the City of Seattle, WA

Contracting Agency:
City of Seattle
Department of
Transportation
700 5th Avenue
Suite 3800
Seattle, WA 98104

Project Scope: NCE was commissioned to perform a study to determine the impacts of utility cuts on street pavements by Seattle Transportation. The City experienced over 9000 new utility cuts every year, caused by a dozen private and public utilities. This study was to determine the extent of degradation and costs associated with maintenance repairs and rehabilitation due to the presence of utility cuts. Seattle had an extensive and well documented pavement management program, and almost a thousand sites were statistically analyzed to develop performance models. A structural approach using deflection testing was also used on select pavement sections. The following tasks were performed by NCE.

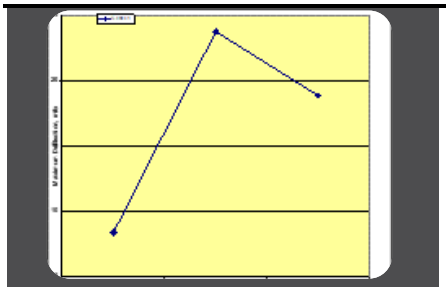
- Reviewed of literature and City's data sources.
- Identification of candidate sections.
- Statistical analysis of historical data from pavement management system data.
- Structural approach using deflection testing .
- Data analysis and model development.
- Report preparation.
- Presentations to City staff.

Impact of Utility Cuts on Street Performance for the City of Philadelphia, PA

Contracting Agency:
City of Philadelphia
Streets Department
1401 John F. Kennedy Blvd
Philadelphia, PA 19102

Project Scope: NCE was selected by the City of Philadelphia to determine the impacts of utility cuts on pavements and to develop a utility cut fee. An experiment design was developed that included pavements from different functional classifications, ages and surface types was developed. Then a combination of condition surveys and deflection testing was used to measure the accelerated deterioration in pavements. Finally, statistical analysis was performed to measure the effects of the utility cuts and the results were used to develop a fee schedule.

The figure to the right illustrates the fact that highest deflections were obtained two feet away from the edge of the pavement cut. NCE



worked with both the Public Works and Legal Departments during the development of the fee ordinance.

COST ESTIMATE

NCE's cost estimate for the above scope is shown in the table below.

Task Description	Hours by Personnel					Deflection Testing	Coring	Traffic Control	Other Direct Costs	Total Cost
	Principal-in-Charge	Project Engineer	Staff Engineer	Field Technician	Project Administrator					
	$250/Hr	$195/Hr	$170/Hr	$100/Hr	$100/Hr					
Task 1- Project Management and Meetings	3	16	8		4				$ -	$ 5,630
Task 2-Vehicle Impact Fee Study										
2A Data Collection		8	8						$ -	$ 2,920
2B Impact Analysis and Fee Schedule Development	1	24	24							$ 9,010
2C Draft and Final Reports	2	24	16		6					$ 8,500
Task 3- Utility Cut Impact Fee Study										
3A Historical Evaluation		32	16							$ 8,960
3B Field Evaluation										$ -
3B.1 Site Selection		8	32						$ 1,000	$ 8,000
3B.2 Structural Analysis		16	24	8		$ 24,000	$ 5,000	$ 14,630	$ 730	$ 52,360
3B.3 PCI Survey			8	16					$ 520	$ 3,480
3C Fee Schedule Development	2	32	8							$ 8,100
3D Draft and Final Reports	2	24	16		8					$ 8,700
Task 4- Presentation to BOS	6	12							$ 500	$ 4,340
Totals	**16**	**196**	**160**	**24**	**18**	**$ 24,000**	**$ 5,000**	**$ 14,630**	**$ 2,750**	**$ 120,000**

Assumptions

Task 1 assumes video-conferencing for meetings and includes project management.
Task 2A requires coordination with the County on data gathering and assumes one virtual meeting.
Task 2C includes one round of revision of draft report from the County.
Task 3A assumes that StreetSaver® database has sufficient data for developing a model.
Task 3B.1 assumes that 24 sites will be selected and marked in the field for testing.
Task 3B.2 includes 6 days of deflection testing, 1 day of coring and and 7 days of traffic control. 1 day of coring assumes collecting approximately 12 cores.
Task 3B.3 includes PCI survey on the selected sites.
Task 3D includes one round of revision of draft report from the County.
Task 4 includes one virtual presentation.

PROJECT SCHEDULE

NCE's proposed schedule is shown below.

TASK DESCRIPTION	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	Week 13	Week 14	Week 15	Week 16	Week 17	Week 18	Week 19	Week 20
Task 1- Project Management and Meetings	X																			
Task 2-Vehicle Impact Fee Study																				
2A Data Collection		X																		
2B Impact Analysis and Fee Schedule Development																				
2C Draft and Final Reports																				
Draft Report																				
County's Review																				
Final Report																				
Task 3- Utility Cut Impact Fee Study																				
3A Historical Evaluation																				
3B Field Evaluation																				
3B.1 Site Selection																				
3B.2 Structural Analysis																				
3B.3 PCI Survey																				
3C Fee Schedule Development																				
3D Draft and Final Reports																				
Draft Report																				
County's Review																				
Final Report																				
Task 4- Presentation to BOS (Optional Task)															To be Determined					

Assumptions

1. "X" assumes video-conference meetings.
2. Task 2A assumes that all necessary data will be collected from the County within 2 weeks.
3. Tasks 2C and 3D include one round of County's review of the draft report.
4. Tasks under 3B assumes no weather delays.
5. Task 4 would need atleast 2 weeks notice before the meeting for slides preparation

APPENDIX A – RESUMES

Vivek Jha, MS, PE – Project Manager and QA/AC Manager

Vivek is a Professional Engineer and is the Southern California Operations Manager at NCE. He brings over 13 years of experience in delivering pavement projects on budget and schedule. He is adept at managing the entire project life cycle including developing and maintaining project schedules, controlling project costs, tracking and documenting variances, developing technical and business reports and QC of other reports and data. Vivek has experience with the AASHTO 1993 Design Guide, Pavement ME/MEPDG, DCP, GPR, FWD, as well as various pavement management software such as StreetSaver® and PAVER™.

Education
MS, Civil Engineering, Rowan University, Glassboro, NJ, 2009
BS, Civil Engineering, Sardar Patel College of Engineering, Mumbai, India, 2007

Registrations/Certifications
Professional Engineer, Civil
MD, NJ
HMA Plant Technologist, Superpave Levels 1 & 2
HMA Construction Technologist

Affiliations
Advisory Board Member, CREATEs

Joined NCE
2022

Years of Experience
13 years

Representative Projects

2024 Street Rehabilitation Program

City of San Marino, CA

Client Manager/PMP and Pavement Design Lead. As part of the City's annual street rehabilitation program, NCE is providing pavement evaluation and design services for various roadways. The scope of work for the 2024 Street Rehabilitation Program includes pavement condition surveys, coring, sampling, and laboratory testing. Based on the pavement evaluation a pavement design and soil investigation memorandum will be prepared, which will include treatments with a focus on sustainable treatments and cost-saving measures. Technical specifications will also be provided. Vivek is currently serving as Client Manager, PMP/Pavement Design lead for the City's most recent annual street rehabilitation program.

Pavement Management Program (PMP) Update

City of Anaheim, CA

Project Manager. The City has approximately 584 centerline miles and NCE has been assisting the City with updating the PMP since 2013 including transitioning from PAVER™ to StreetSaver®. Vivek is currently managing the latest round of their PMP update using StreetSaver®. He is responsible for the analysis and quality control of pavement distress data, updating maintenance and rehabilitation decision trees and the treatment unit costs, and the development of budget scenarios and summary reports including submitting the OCTA report for Measure M2 funding.

Pavement Management Program

Cathedral City, CA

Client and Project Manager. NCE is assisting with the development of a comprehensive Pavement Management Program (PMP) to improve the City's ability to more effectively and strategically manage and maintain its 157 centerline-mile street network. The project consists of furnishing all necessary

services to develop a comprehensive PMP which will provide City policymakers and asset management professionals with the City's pavement network in terms of miles and area, the current Pavement Condition Index (PCI) of the network, recommendations for future maintenance and rehabilitation strategies, Identification of funding required to perform maintenance and repair treatments over the next 5 years, various investment and treatment scenarios to improve network PCI over time, and information regarding additional funding required to achieve system PCI goals.

Pavement Management Program Update

City of Corona, CA

Project Manager. NCE implemented a PMP for the City that has approximately 400 centerline miles (3100 roadway sections) in 2011. NCE has performed updates on portions of the City's network since then. Vivek is currently managing the latest round of their PMP update using StreetSaver® software.

Pavement Management and Pavement Surveys

San Diego County, CA

Deputy Project Manager. Covering an area of nearly 1,500 square miles, the County maintains approximately 1,950 centerline miles of roadways. The network is comprised of approximately 1,843 centerline miles of asphalt concrete roadways, with the remainder being exposed cement concrete or unpaved disintegrated granite. As part of this project, Vivek assisted in summarizing the work done by the County and its impact on the "Road to 70" goal and determined the determining the PCI of the underserved communities in each CPG. He is currently assisting the County in identifying sections with missing As-Built data based on the 2015/16 and 2021 network pavement condition surveys.

Pavement Management Program Update

City of Diamond Bar, CA

Project Manager. The City has approximately 145 centerline miles with 1,014 pavement segments. NCE has been assisting the City with updating the PMP since 2015 including transitioning from PAVER™ to StreetSaver®. Vivek assisted the City with the latest round (2022) of their PMP update. As part of this project, Vivek was responsible for the analysis and quality control of pavement distress data, updating maintenance and rehabilitation decision trees and the treatment unit costs, and the development of budget scenarios and summary reports.

Pavement Management Program

City of Aliso Viejo, CA

Project Manager. NCE is assisting the City in updating its MicroPAVER™ PMP. The previous citywide update was prepared in 2018 in compliance with OCTA's M2 requirements. The City has approximately 75 centerline miles of public streets. The City is requesting these services to inspect and prepare street condition ratings. NCE will input the data collected during the field survey into the MicroPAVER™ database provided by the City and generate the required reports for the Pavement Management Program.

Margot Yapp, PE – Principal-in-Charge

Margot has 30 years of extensive experience in the area of transportation engineering, specializing in pavement studies, design, asset/pavement management, and research for roads, highways, and airfields. Her experience includes managing numerous turnkey implementations and updates of pavement management systems (PMS) for cities, counties and airports throughout California, Oregon, Nevada, Hawaii and Texas. Margot has taught workshops on pavement management systems for the National Highway Institute and the Federal Highway Administration.

Additionally, Margot's has experience working on numerous pavement impact studies caused by different truck traffic as well as those from utility cuts. She has used a variety of rigorous technical approaches to determine these impacts such as:

- Development of an experiment design to ensure that all variables affecting pavement impacts are included;
- Rigorous statistical analyses to ensure that results and conclusions are significant;
- Pavement structural analysis, including the use of deflection testing; and
- Pavement condition analysis, employing the use of pavement management data.

In each case, the appropriate technical approach was selected depending on the type of study and the data available.

Education
MS, Civil Engineering, Oregon State University, Corvallis, 1987
BS, Civil Engineering, Oregon State University, Corvallis, 1985
BS, Forest Engineering, Oregon State University, Corvallis, 1985

Registrations/Certifications
Professional Engineer – Civil, CA, #45027

Affiliations
American Society of Civil Engineers
American Public Works Association
TRB Subcommittee A2B01 – Local Agency Pavement Management

Joined NCE
1994

Years of Experience
30 years

Representative Projects

Trench Cut Fee Study

City of Anaheim, CA

Project Manager. NCE was selected by the City of Anaheim to provide a Trench Cut Fee Study for the City's streets. The City is looking into ways to recover both its direct and indirect costs through fees, and desires to evaluate the impact of pavement cuts on the structural integrity of asphalt concrete streets. The City owns and maintains approximately 581.73 centerline miles of pavements, which includes 156.57 centerline miles of the Master Plan of Arterial Highways (MPAH) streets (AHS network) and 425.16 miles of local streets (LSS network). NCE's responsibilities will include a Preliminary Study Report (PSR), Study Workshop, Final Study Report, as well as providing Outreach and Coordination (Council and Fee Workshops, study development meetings, and public meetings).

Impact of Utility Cuts on Performance of Seattle Streets

City of Seattle, WA

Project Manager. NCE was commissioned to perform a study to determine the impacts of utility cuts on street pavements by Seattle Transportation. This study was to determine the extent of degradation and costs associated with the presence of utility cuts. This study utilized the methodology that was also adopted by many other cities around the U.S. and has been cited by APWA and many other publications related to the impacts of utility cuts.

Impact of Utility Cuts on Performance of Street Pavements

City of Philadelphia, PA

Principal. NCE was selected by the City of Philadelphia to determine the impacts of utility cuts on pavements and to develop a utility cut fee. An experiment design was developed that included pavements from different functional classifications, ages and surface types was developed. Then a combination of condition surveys and deflection testing was used to measure the accelerated deterioration in pavements. Finally, statistical analysis was performed to measure the effects of the utility cuts and the results were used to develop a fee schedule.

Evaluation of Pavement Cuts

Regional Transportation Commission (RTC) of Southern Nevada, Las Vegas, NV

Project Manager. NCE investigated the impacts of pavement cuts (from utilities as well as street maintenance) on streets within the Cities of Las Vegas, North Las Vegas, Henderson as well as Clark County. This project objective was to determine if there was an impact on pavements from the presence of pavement cuts, and if so, to quantify that impact and the costs for restoration.

Impact of Utility Repairs on Performance of Street Pavements

Cities of Santa Rosa, Chico, Bishop, CA and Salem, OR

Project Manager. Similar utility cut studies were performed for the Cities of Santa Rosa, Chico, Bishop and Salem. Deflection testing was utilized to determine the impacts of utility cuts, and fee schedules were developed. The cities did not possess historical data and no PMS data were available, therefore, deflection testing was the only approach available.

Multiple Pavement Management Systems Studies

Orange County Transportation Authority, CA

Principal-in-Charge. NCE has worked with OCTA since 1997 on various projects related to pavement management systems. There are over 6,500 centerline miles of paved streets and roads in Orange County, serving a population of almost three million. In 2010, NCE assisted OCTA in developing countywide guidelines for the PMP. This was to ensure consistent data collection procedures for all 35 jurisdictions so that funding allocations could be made on an "apples to apples" comparison. Since 2011, NCE has developed and conducted training workshops on the PMP software, as well as conducting field surveys as per ASTM D6433 protocols. To date, over 12 workshops have been delivered to all 35 local agencies in Orange County.

Multiple Pavement Management System Implementations and Updates

Various Cities and Counties, CA

Project Manager. Margot has been responsible for PMP/PMS updates for many cities and counties inside and outside of California. She is responsible for the analysis and quality control of pavement distress data collection, updating maintenance and rehabilitation decision trees and the treatment unit costs, and the development of budget scenarios and summary reports. She has developed cost-effective maintenance treatments and strategies, prepared custom multiple-year detailed street maintenance plans and budget option reports, and linked GIS maps with management sections in the client's PMP/PMS database.

Debaroti Ghosh, PhD – Project Engineer

Debaroti is well-experienced serving as Project Engineer on pavement management, maintenance, rehabilitation, design, and planning projects at NCE. She has expertise in asphalt material characterization, material rheology assessment, pavement management system, construction material lab testing, non-destructive and accelerated pavement testing. Her non-destructive pavement testing experience includes using ground penetrating radar (GPR), rolling density meter and falling weight deflectometer. Debaroti is proficient in pavement design, soil-mechanics, pavement preservation, concrete pavement evaluation, earthquake engineering and pavement distress identifications. She also has experience in rigorous data analysis and structural analysis.

Education
PhD, Civil Engineering, University of Minnesota, Twin Cities, 2018
MS, Civil Engineering, University of Oklahoma, 2014
BS, Civil Engineering, Bangladesh University of Engineering/Technology, 2010

Registrations/Certifications
MTC StreetSaver® Rater Certification Program

Affiliations
American Society of Civil Engineers (ASCE)
Women in Transportation Engineering
Association of Asphalt Pavement Technology (AAPT)

Joined NCE
2018

Years of Experience
5 years

Representative Projects

Vehicle Impact Fee

City of Elk Grove, CA

Project Engineer. The City of Elk Grove was interested in implementing a continual vehicle impact fee for the damage done to the City's residential streets resulting from a new weekly organics refuse collection. Currently, the City has weekly garbage and bi-weekly recycling and green waste collection. As Project Engineer, Debaroti assisted the City in developing an appropriate measure to assess pavement damage from the extra organics refuse vehicles and their associated vehicle impact fees.

Vehicle Impact, Heavy Construction Vehicle, and Utility Cut Fee

City of Pacifica, CA

Project Engineer. NCE was selected by the City of Pacifica to evaluate the impact of utility cuts, heavy construction vehicle, and refuse collection trucks on the City's street network and to develop appropriate measures, including a fee study. As Project Engineer, Debaroti assisted the City in determining the financial impact of the waste/refuse collection vehicles on the City's street network. She also assisted in developing the impact fees associated with heavy construction vehicles and utility cuts.

Develop Multi-Year Paving Work Plan

Various Cities and Counties, CA

Project Engineer. Debaroti has been involved in developing multi-year paving work plans for various cities and counties. This includes budget analyses based on the agency's criteria to select streets, street selection based on PCI and consideration of key elements identified by the Agency, confirmation of treatments in the field, aggregation or grouping of streets if needed, evaluating poor condition roads and separation/ combination of surface seal or rehabilitation paving programs, and preparation of final list and map.

2018-2022 Street Surface Seal and Rehabilitation Projects and Multi-Year Work Plans

City of South San Francisco, CA

Project Engineer. NCE has been providing a full range of pavement management services including development of a 5-year Paving Work Plan, updating the City's maintenance and rehabilitation decision tree, evaluating alternative pavement treatment technologies, and development of construction documents for bidding. To date we have developed pavement design and civil design for rehabilitation and preventive maintenance of 48 miles (more than 200 street sections) of City streets with a construction cost of over $14 million. Pavement and civil design services for preventive maintenance include scrub/ slurry/cape seals and rehabilitation such as mill and overlays and surface reconstruction. Design services included pavement coring, curb/gutter replacement, utility coordination, curb ramp design, drainage improvements, sidewalk replacement, pavement design recommendations, PS&Es, and bidding and construction support services.

SFO On-Call Pavement Engineering

San Francisco International Airport, CA

Project Engineer. Debaroti has been involved in a variety of field investigation and design work at the San Francisco Airport. These include pavement evaluation of Runway 10L-28R, and Taxiways A and B. These projects have involved a variety of destructive and non-destructive testing (such as coring, deflection testing, and ground penetrating radar testing) and complex analyses and design using back calculation and FAA design software.

Various Road Rehabilitation Projects

Various Cities and Counties, CA

Project Engineer. Debaroti has performed pavement designs on various streets all over California. The designs usually includes field evaluation using detailed pavement visual assessment, non-destructive testing using FWD, and coring with dynamic cone penetrometer testing and lab test results of existing pavement road base and subgrade soils. Using the data obtained, Debaroti performs pavement analysis and design to develop pavement treatment recommendations. Several analytical approaches were used to explore and assess efficient pavement designs for each road segment. The use of green recycling pavement technologies, such as Cold In-place Recycling (CIR) that has both cost and environmental benefits and is less disruptive to traffic than conventional mill and overlays were evaluated as options for the recommended treatments. Some of her pavement design projects are listed below.

Project Name	Design Year	Agency	Centerline Miles
Castro Ranch Road Rehabilitation	2019	City of Richmond, CA	1.6
Pavement Rehabilitation 2019 SB1	2019	City of Sunnyvale, CA	4.0
CIP 2019-06 Street Enhancement	2020	City of Huntington Park, CA	1.0
2018-2021 Pavement Rehabilitation	2020	City of South San Francisco, CA	7.0
2020 Pavement Rehabilitation	2020	Town of Moraga, CA	1.6
RMRA Mitigation-Funded Road Repair	2020	Tuolumne County, CA	12.5
County Roads 31 and 32 Pavement Design	2020	Yolo County, CA	7.7
2021 Pavement Rehabilitation	2021	City of South San Francisco, CA	3.4
2021 Road Resurfacing/Paving Program	2021	Calaveras County	17.3
2021 Paving Program Phase 2	2021	Calaveras County	49.34
2022 West of 101 Pavement Rehabilitation	2021	City of South San Francisco, CA	17.0
Corridor Project 2021-Pavement Design	2021/22	City of Sacramento, CA	5.0 (15 Lane-miles)
FY 2022-23 Surface Seal and Rehabilitation	2022	City of Martinez, CA	6.4

Mahmoud Samara – Staff Engineer

Mahmoud recently began his engineering career as a Staff Engineer at NCE and has been involved in pavement-related projects that include pavement design and evaluation, rehabilitation and maintenance, and pavement and asset management. Prior to joining to NCE, Mahmoud served as a graduate research assistant in Research and Education in Advanced Transportation Engineering Systems (CREATEs) at Rowan University, New Jersey. He has expertise in the areas of laboratory performance characterization of flexible pavements materials, pavement management system, life cycle cost analysis of pavement structures, non-destructive testing (falling weight deflectometer, FWD), and flexible pavement design. Mahmoud has authored several publications and has given presentations on performance of asphalt binders at annual meetings for the Transportation Research Board (TRB).

Education
MS, Civil and Environmental Engineering, Rowan University, Glassboro, New Jersey, 2022
BS, Civil Engineering/Highway and Bridges Engineering, Al-Balqa Applied University, Salt, Jordan, 2017

Affiliations
Associate member with the American Society of Civil Engineers (ASCE)
Student Member in Academy of Pavement Science and Engineering (APSE)
Friend of TRB committee AKM20
Member in TRB Young Members Subcommittee

Joined NCE
2022

Years of Experience
2 years

Representative Projects

2022-2023 Street Rehabilitation Program
City of San Marino, CA

Staff Engineer. NCE is providing civil engineering services to prepare plans, specifications, and cost estimates for the City's annual street rehabilitation project. In 2021 the City Council adopted a 5-year pavement management program.

Pavement Management Program (PMP) Update
City of Anaheim, CA

Staff Engineer. NCE updated Anaheim's PMP in compliance with OCTA's Measure M2 requirements. The street network consists of approximately 584 centerline miles of pavement including 155 miles of Arterial Highway System (AHS) and 429 centerline miles of Local Street System (LSS). The project consists of furnishing all necessary services to develop a comprehensive PMP including distress/condition inspections as per ASTM D6433 protocols, collected ride quality (International Roughness Index) and digital images of the pavements updated the maintenance and rehabilitation (M&R) history, and performed funding scenarios.

Pavement Management Program
Cathedral City, CA

Staff Engineer. NCE is assisting with the development of a comprehensive Pavement Management Program (PMP) to improve the City's ability to more effectively and strategically manage and maintain its 155 centerline-mile street network. The project consists of furnishing all necessary services to develop a comprehensive PMP which will provide City policy makers and asset management professionals with the City's pavement network in terms of miles and area, the current Pavement Condition Index (PCI) of the network, recommendations for future maintenance and rehabilitation strategies, Identification of funding required to perform maintenance and repair treatments over the next 5 years, various investment and

treatment scenarios to improve network PCI over time, and information regarding additional funding required to achieve system PCI goals.

2019-2026 StreetSaver Technical Assistance

Metropolitan Transportation Commission (MTC), CA

Staff Engineer. NCE has been involved in numerous projects related to the development, implementation, and training of the StreetSaver® program. NCE implemented the StreetSaver® PMP in over 150 agencies since 1994. NCE has been a P-TAP consultant since Round 1 in 1998/1999. This includes NCE's technicians and engineers being certified in MTC's certification program. NCE was involved with the beta testing of different versions of the StreetSaver® software since 1994 and has been a member of the software development team. NCE has trained users on the StreetSaver® software since 1997, including the development of the training materials, ensuring interaction in the training, and conducting the training.

Pavement Management Program (PMP) Update

City of Lemon Grove, CA

Staff Engineer. NCE is providing an update to the City's PMP. The project consists of reviewing all public roadways within the City, evaluating and updating/upgrading the City's existing PMP software, and providing CIP planning document for a five-year capital budget. The City's street network is approximately 70 centerline miles with 486 pavement segments. The City currently uses StreetSaver® for its PMP needs.

Roadway Analysis and Distress Surveys for County Roads

County of Orange, CA

Staff Engineer. NCE is providing pavement distress surveys in accordance with ASTM D6433-11 on roadways for the unincorporated portions of Orange County and the City of Dana Point for a five-year period beginning in FY 2020-2021 through FY 2024-2025. The County of Orange and the City of Dana Point maintain approximately 365.1 miles and 93.5 miles of roadways, respectively, which includes both the Master Plan of Arterial Highways (MPAH) and local public roads. Both the County and City perform biennial updates of its Pavement Management Program (PMP) to assist policy makers in making decisions for road maintenance as well as complying with the County of Orange Transportation Authority (OCTA)'s Measure M2 Program.

As-Needed Consultant Services for Pavement Management and Road Surveying

County of San Diego, CA

Staff Engineer. NCE is providing pavement management engineering services on as-needed basis to support and assist the Department of Public Works in the development of the County's Pavement Management projects. Covering an area of nearly 1.500 square miles, the County maintains approximately 1,945 centerline miles of roadways. The network is comprised of approximately 1,800 centerline miles of asphalt concrete roadways with the remainder being exposed concrete pavement (approximately 30 centerline miles) or unpaved disintegrated granite (approximately 101 centerline miles). The County manages the paved roadways using a computer-based Pavement Management System (PMS) known as StreetSaver as developed by the Metropolitan Transportation Commission (MTC). A network-wide pavement condition survey was completed in 2021 on all County Maintained Roads. The survey collected data for pavement surface distress types, severities, quantities, and locations for entry into the PMS application and determination of segment Pavement Condition Index (PCI) values. NCE is developing pavement performance models from the data and as well as maintenance, repair, and rehabilitation work plans or budgets.

CITY OF PACIFICA
COUNCIL AGENDA SUMMARY REPORT

3/14/2022

Sample City Report:

SUBJECT:

Study Session on Utility Pavement Cut and Construction/Waste Truck Roadway Impact Fee Studies

RECOMMENDED ACTION:

Receive Report on Utility Pavement Cut and Construction/Waste Truck Roadway Impact Fee Studies

STAFF CONTACT:

Lisa Petersen, Director of Public Works
(650) 738-3770
lpetersen@pacifica.gov

Ryan Marquez, Associate Engineer
(650) 738-3769
rmarquez@pacifica.gov

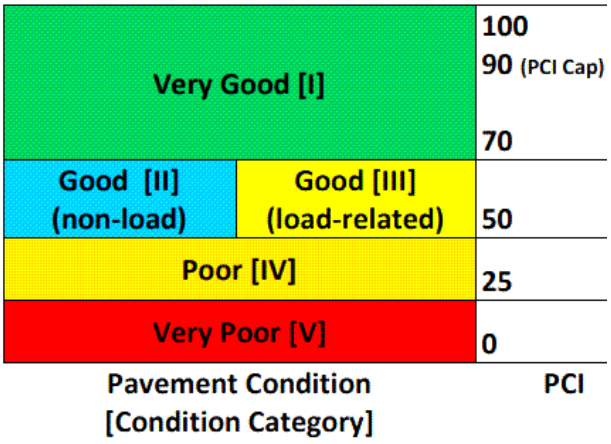
BACKGROUND/DISCUSSION

The City of Pacifica is responsible for maintaining over 90 centerline miles of street pavement. In order to fund street maintenance work, the City adopts a budget every year for an annual street maintenance project as part of the Capital Improvement Program (CIP). At the October 12, 2020 City Council meeting, staff provided Council an update on the overall condition of the City's pavements based on the City's 2019 Pavement Condition Index Report (also known as the Budget Options Report). At this meeting, Council approved the City's 5-year Street Maintenance Program. Additionally, Council approved an agreement with NCE Consulting Engineers to provide a study that reviewed the impact of utility cuts and construction/waste trucks on the City's street network to develop a proposed fee related to these impacts. The purpose of this study session is to present the results of this study and collect feedback from Council members on the proposed fees.

The City's funding for streets since FY18/19 included one-time funding of $900,000 from the City's General Fund and One Bay Area Grant (OBAG) funding and ongoing funding from Senate Bill 1 (SB1) and Measure W funding with yearly allocations of approximately $600K and $440K, respectively. Additionally, rollover Measure A money in Street Construction Fund (Fund 9) of approximately $350K/year was provided for the City's adopted 5-year Street Maintenance program that concludes in FY 2024/25. These limited funding sources will not be sufficient to prevent some of the City's streets from deteriorating and requiring expensive maintenance treatments or prevent the City's overall pavement condition from continuing to drop. The October 12, 2020 Council report noted that the City would need to identify other funding strategies to prevent further degradation of the City's street network and to address the accumulating deferred pavement maintenance backlog that continues to grow.

2021 Budget Options Report

Since discussion of the 2019 Budget Options Report in October of 2020, a new Budget Options Report (BOR) has been received by the City from the Metropolitan Transportation Commission's (MTC) consultant (Fugro) that was completed in March of 2021 as part of the MTC Pavement Management Technical Assistance Program (P-TAP). Like the 2019 BOR, the 2021 BOR shows the City's pavements continuing to degrade under current funding levels, highlighting the City's need to find alternative funding strategies for City streets. Pavement condition is expressed in terms of a number called Pavement Condition Index (PCI) that rates pavements between 0 and 100, with 0 used for failed pavement and 100 used for new pavement. MTC's most recent report on Bay Area cities pavement conditions shows that the City of Pacifica has the lowest Pavement Condition Index (PCI) of all 101 Bay Area cities. The 2021 BOR report projects Pacifica's overall PCI to drop from 42 to 38 (both considered Poor Condition Category) by 2025 at current funding levels and continue a downward trend. Separating streets into low traffic and high traffic streets, the report shows the City's low traffic residential streets have an average PCI in the low 30's and the City's higher traffic arterial/collector streets have an average PCI of around 50. The below table provides a breakdown of pavement condition category related to PCI:



The 2021 BOR report can be found on the City's website at www.cityofpacifica.org/depts/pw/engr/city_streets_maintenance_program/default.

The 2021 BOR report shows that to stop the PCI decline, the City would need to identify at least $900,000 of additional pavement funding per year beyond the current pavement funding level of $1.35 M per year. It is also important to note that the City is using reserve Measure A funds of $350,000 per year towards the current pavement funding level that will run out in the next several years. Consequently, to maintain the current PCI in these out years, they City would need to increase funding by $1.25 M to stop the City's overall PCI decline. Additional funds beyond this would be needed to increase the City's overall pavement condition.

Utility Pavement Cut Fee and Construction and Waste Truck Pavement Impact Fee Studies

Following Council's approval of the NCE agreement to perform this study, and in-line with Council's goals of *Stewardship of City Infrastructure* that includes improving street conditions, staff has been working with NCE on pavement funding strategies related to utility pavement cuts and construction/waste truck impact fees. Implementation of these fees would allow for increased pavement funding that could help halt the continued downward trend of the City's pavement condition and allow for additional streets to be added to the City's current 5-year Street Maintenance Program. These funding strategies are based on scientific data that

correlates pavement damage to pavement trenching and construction and waste truck street use.

Although California law does not allow cities to charge general road use fees to companies that are using a jurisdiction's roadways, State laws do allow for collection of one-time fees related to construction impacts by developments to roads or caused by utility trench cutter's use of City property. Additionally, costs related to pavement impacts from waste trucks could be included as part of a franchise fee, if agreed to by the City's franchise solid waste hauler, in recognition of the impacts that waste vehicles have to a City's roads. The following paragraphs will discuss the findings of these studies and data that supports fees to be charged to offset damages being caused to Pacifica's streets by these activities. Fee recommendations related to waste truck impacts will be discussed with Council during upcoming discussions with Recology of the Coast on their franchise agreement. Fees related to construction vehicle impacts and utility cuts will be discussed with Council during the upcoming end of the fiscal year budget meetings related to annual Fee Schedule adoption.

Fees can be reduced for all developments or for a certain type of development for a justifiable reason associated with a Council adopted policy. The policy does not need to be adopted before reducing fees. At the Fee Schedule adoption meeting, staff will recommend fee changes related to City development/construction activities as noted below:

- *Construction Vehicle Pavement Impact Fees and Utility Cut Fees for Accessory Dwelling Units (ADU)* - Any ADU that is under 750 square feet shall not be charged a pavement impact fee or utility cut fee. Staff is recommending that both fees shall not be charged for an ADU of any size when the ADU is being constructed at the same time, under the same permit, as a new main residential unit or an expansion of the main unit that make payment of the fees as required. The Council has also directed staff to evaluate policies to incentivize affordable housing production by reducing fees during the Housing Element development and implementation.

- *Partially or Fully Credit Utility Cut Impact Fees for Developments with Pavement Improvements* - As a condition of approval, many new developments are required to pave the roadway in front of the development as a nexus for improving infrastructure adjacent to the development as well as impacts the development's utility cuts may have on the road. Staff will recommend providing these developments a credit against their Utility Cut Impact fees for completing frontage roadway paving as this will mitigate the impacts of the cut.

- *Reduced Utility Cut Impact Fees Related to Sewer Lateral Repairs Not Requiring a Lateral Compliance Certificate* - Staff will recommend charging a minimal fee ($500) for pavement cuts related to fixing a sewer lateral not requiring a Sewer Lateral Compliance Certificate. Lowering the fee for these types of repairs will prevent the fee from becoming an obstacle to needed sewer lateral replacement for cracked/broken laterals.

Waste and Construction (Heavy) Vehicle Impact Study

Cities can collect fees for pavements related to waste vehicles through a franchise fee or separate fee as part of a negotiated requirement in the franchise agreement. They can also collect one-time fees from developers for heavy construction vehicle roadway impacts. The City recently completed a study (Attachment 1) related to the impacts of waste and heavy vehicle (construction) impacts on pavement longevity to determine what a correlated fee would be. The purpose of the study was to estimate the structural and therefore financial impact to the roadway from waste and construction vehicles.

Waste Vehicles

Over the past 15 years, the number of waste vehicles has increased on local roads and streets throughout California. Historically, one waste vehicle provided services once a week. More recently, three vehicles (e.g., garbage, recycling, organics) provide weekly or biweekly services. The impact of waste truck trips has been studied by many cities and was recently studied by NCE Consulting Engineers for the City of Pacifica with the goal of answering two questions:

1) What impact do waste vehicles have on the pavement life of Pacifica streets?
2) What is the corresponding financial impact to the City of Pacifica?

Using a technical approach through Caltrans Highway Design Manual and the American Association of State and Highway and Transportation Officials (AASHTO), reviewing weight of vehicles and frequency of trips and condition of Pacifica's pavement, NCE was able to determine the impact waste vehicles have on the life of Pacifica's pavements. Staff projected that the City's ultimate goals would be in the next 15 years to raise the City's residential streets up from a PCI in the low 30's to a PCI of 60 and the combined arterial and collector street PCI from a 50 to a 70. This would provide for all the City's streets to be in the "Good" condition category range and lower the overall cost of maintaining the City's roadways.

With the above information, NCE was able to provide answers to the questions related to pavement life and financial impact. It is important to note that these impacts are directly related to the existing condition of a jurisdiction's roadways, consequently, fees between cities do not provide an "apples to apples" comparison. Based on the NCE study, in Pacifica waste vehicles consume 10% of residential street pavement life and 6% of arterial/collector street pavement life each year. This translates into a yearly cost to the City of $511,000 damage to residential pavements and $184,000 damage to arterial/collector streets. Cities that collect fees related to waste truck pavement impacts typically do this through the waste company franchise fee that is sometimes included as a separate fee line.

Heavy Construction Vehicles

The study also looked at the damage that is caused to City streets during construction of development projects by heavy construction vehicles traversing City streets to get back and forth from development projects. The impact of heavy construction vehicles to pavements from these trips has been studied by many cities and was included in the recent NCE pavement impact study for the City of Pacifica. Pacifica requested NCE review the impacts to city streets caused by heavy vehicle construction activity on City streets related to developments.

The study noted that damage to pavement caused by heavy construction vehicles during construction of development projects is similar to the damage caused by waste vehicles, however, heavy construction vehicles do not traverse City streets in the same manner (i.e., weekly route through all neighborhoods). Estimating this damage cost for the study of heavy construction vehicles was completed by the following:

- Calculating the average cost per vehicle-mile traveled through conversion of yearly waste vehicle damage.
- Estimating the conservative number of vehicle trips/miles travelled to development sites.
- Developing costs associated with square foot of construction with other options.

Using this information, NCE's report recommendation includes a per square foot price for residential, multi-family, and commercial developments of $1.19/square foot of new structure. This would translate to a one-time fee of $2,126 for a new 1800 sf single family home or $952

for a new 800 sf multi-family unit.

Utility Cut Fees

Study and quantification of the impact of utility cuts on road and street performance has been occurring for over 30 years. Public agencies, as well as utility companies, have sponsored engineering investigations and studies to quantify the impact of utility cuts on pavement performance and estimate the financial cost. NCE Consulting completed a study of the impact of utility cuts to Pacifica's pavements (Attachment 2). The purpose of this study was to compare pavement performance for the street sections with and without cuts, quantify damage caused by utility cuts to the pavements within the City and develop a fee schedule for the City to recover any costs associated with such damage.

To accomplish this, NCE looked at both the structural and functional deterioration of pavements due to utility cuts. The field evaluation included selecting sixteen sites on city streets of different ages. Deflection testing using a falling weight deflectometer (FWD) was conducted to assess loss of structural capacity due to cuts. In addition, the City's StreetSaver® database, which contains 15 years of pavement distress data and thousands of data points with a wide range of pavement age and conditions, was analyzed to assess the impact of utility cuts. The findings from the study included:

- Pavements with cuts of any size deteriorate more than pavements without cuts across all pavement age groups (0-5 years, 6-10 years, 11-15 years and >15years). The exception is residential streets older than 10 years with small cuts (cut area <10% of section area). However, the cumulative effect of multiple small cuts is equivalent to a section with large cuts.
- On average, the PCI drops by 30% if the cut area is greater than 10% of the section area.
- Cuts do more damage to new (< 10 years) pavements than older (≥10years) pavements. This results in an average percent reduction of the remaining service life of approximately 33% for new pavements and 17% for old pavements.

These findings were used to develop a fee schedule for the City of Pacifica that is shown in the table below:

Fee, $/SF			
Functional Class	Age Group	Cut Area (Percent of Section Area)	
		<10% of Section Area	≥10% of Section Area
Arterials/ Collectors	<10 years	$ 2.50	$ 4.00
	≥10 years	$ 1.50	$ 2.50
Residential	<10 years	$ 1.50	$ 3.00
	≥10 years	$ 1.00	$ 2.50

As noted above and will be discussed more during the Study Session presentation, although individual small cuts show less significant difference, there is a cumulative impact from multiple small cuts. Over time, this impact will be equivalent to a section with large cuts (10% or greater). The fee calculation (as shown in the Study) accounts for this by having the small cuts pay a "fair share" for this cumulative effect by dividing the small cut fee total by 10%. Additionally, because pavement cuts cause "slumping" of the soil 2 feet beyond the cut area, this area also needs to be accounted for to assess the correct impact to the pavement. For example, a 4'x4' cut has the impact of an 8'x8' cut due to this slumping. The following is an example of a 4'x'4 pavement cut fee for a residential pavement 10 years old or older:

$1 x (4+4) x (4+4)/0.1 = $640

Next Steps Related to Pavement Fees

- Waste Truck Fees - Staff will discuss costs related to waste vehicles and City pavements with Recology and the City Attorney's Office as part of current Franchise Agreement discussions with Recology. Staff will return to Council following these discussions with fee options for consideration at a future meeting.

- Construction Vehicle Impact Fees and Utility Cut Fees - Recommended fees related to Construction Vehicle Impact Fee and Utility Cut Fees will be brought to Council for recommendation of adoption at the upcoming yearly budget discussion on Fee Schedule adoption. Recommendations for reducing fees will also be provided, as noted earlier in this report.

Other Cities' Fees Related to Utility Cuts and Waste/Construction Vehicles:

As discussed earlier in this report, utility cut and vehicle impact fees can only be assessed following a study based on scientific data that correlates pavement damage to pavement trenching and construction and waste truck street use, pursuant to State law. Due to differences in pavement conditions, number of streets and other jurisdiction specific data, an "apples to apples" comparison of these fees is not possible and would not be a justification for charging the fee as fees must be based on scientific data as related to a particular city. Many cities do charge these fees and information related to other cities' fees can be found in Attachments 3,4 and 5. For Council's information, the fees developed through the recent NCE pavement Studies are on the lower to mid end of the available fee information shown on these Attachments. Approximate fees on the lowest and highest end of the other jurisdiction's available information are noted below:

- Waste Truck Impact Fee - Belmont $200,000/year, Walnut Creek $1,800,000/year
- Heavy Construction Truck Fee - Citrus Heights $0.72/sf, San Francisco $9.95/sf
- Utility Cut Fee (upper end) - Modesto $2.50/sf, Los Angles $19.50/sf

RELATION TO CITY COUNCIL GOALS AND WORK PLAN:

Approval of these actions is consistent with the following Council adopted Goals:

- Stewardship of City Infrastructure: includes repairing/replacing outdated city facilities such as city hall, the libraries, fire stations, etc., improving streets, and responding to sea level rise.

FISCAL IMPACT:

There is no fiscal impact from this action. The completed Studies provide justification for the City to implement these fees as noted in the report. If the City and Recology of the Coast agree to include a payment to the City to cover the costs associated with waste truck impacts in an amended Franchise Agreement, then the City could receive an additional $695,000 yearly for the City's pavement program. Data has not been compiled related to past yearly numbers of utility trench cuts or total amount of building square footage related to heavy construction truck impact fees. However, staff has estimated heavy construction impact fees could range from

$10,000 to $60,000 per year depending on development levels. Utility cut fees could generate $100,000 to $200,000 per year depending on if large PG&E or telecom projects are completed. For example, the large PG&E project recently completed on Oddstad and Terra Nova would have resulted in approximately $100,000 worth of pavement fees due to the extensive pavement cutting during the project. Should the City decide to charge these fees, the fees cannot exceed the amounts set forth in the Studies and the fees must be charged equally unless the Council has a justifiable policy basis for lowering the fee for certain types of fee payers, as noted earlier in the report.

ORIGINATED BY:

Engineering

ATTACHMENT LIST:

Attachment 1 - Waste & Construction (Heavy) Vehicle Impact Study (PDF)
Attachment 2 - Utility Cut Study (PDF)
Attachment 3 – Other Cities' Waste Vehicle Impact Fees (PDF)
Attachment 4 – Other Cities' Heavy (Construction) Vehicles (PDF)
Attachment 5 - Other Cities' Utility Cut Fees (PDF)

STANDARD TERMS & CONDITIONS FOR INDEPENDENT CONTRACTORS

THESE TERMS & CONDITIONS ("Terms and Conditions") are entered into by and between the County of Santa Barbara, a political subdivision of the State of California ("COUNTY") and [INSERT LEGAL NAME of CONTRACTOR], a [California] [ENTITY TYPE]] whose address is [INSERT CONTRACTOR ADDRESS FOR NOTICE PURPOSES] ("CONTRACTOR" and, together with COUNTY, collectively, the "Parties" and each individually a "Party"), effective as of the date of CONTRACTOR's signature on or other acceptance of the Purchase Order (defined below). **CONTRACTOR's signature on or other acceptance of the COUNTY Purchase Order issued by COUNTY's Procurement Services Division to which these Terms and Conditions are attached ("Purchase Order") means CONTRACTOR has read, accepted, and agreed to these Terms and Conditions.** These Terms and Conditions, together with the Purchase Order, including all attachments and exhibits hereto and thereto, collectively, shall be referred to in these Terms and Conditions as the "Contract" or the "Contract Documents," and each such document comprising the Contract shall individually be referred to as a "Contract Document". For the avoidance of doubt, the Contract and the Contract Documents include the Description of Services (defined below) and the Indemnification and Insurance Requirements (defined below).

1. **SCOPE OF SERVICES / COMPENSATION.** CONTRACTOR agrees to provide to COUNTY the services ("Services") and deliverables ("Deliverables"), and COUNTY agrees to pay CONTRACTOR, as set forth in the Description of Services attached to the Purchase Order and incorporated herein by reference ("Description of Services"). This Contract shall be administered by the COUNTY's Procurement Services Division, and payment hereunder shall be subject to satisfactory performance of the Services and delivery of the Deliverables in accordance with the terms and conditions of the Contract as determined by the Director of COUNTY's General Services Department, or such Director's designee ("Designee"). CONTRACTOR will be entitled to reimbursement for only those expenses specifically identified in the Description of Services.

2. **STATUS AS INDEPENDENT CONTRACTOR.** CONTRACTOR shall perform all of the Services under this Contract as an independent contractor, and not as COUNTY's employee. CONTRACTOR understands and acknowledges that CONTRACTOR will not be entitled to any of the benefits of a COUNTY employee, including but not limited to vacation, sick leave, administrative leave, health insurance, disability insurance, retirement, unemployment insurance, workers' compensation and protection of tenure. CONTRACTOR warrants that CONTRACTOR is authorized by law to perform all work contemplated in this Contract, and CONTRACTOR agrees to submit, upon request, verification of licensure or registration, or other applicable evidence of such official authorization.

3. **BILLING & PAYMENT.** CONTRACTOR shall submit invoice(s) for the Services to the COUNTY at the COUNTY's address set forth on the Purchase Order, in accordance with the invoicing procedures set forth in the Purchase Order or the Description of Services. Unless otherwise specified in the Contract, COUNTY will pay CONTRACTOR within thirty (30) days from COUNTY's receipt of invoice.

4. **TAXES.** COUNTY will not be responsible for paying any taxes on CONTRACTOR's behalf, and should COUNTY be required to do so by state, federal, or local taxing agencies, CONTRACTOR agrees to promptly reimburse COUNTY for the full value of such taxes paid, plus all interest and penalties assessed in connection therewith. Such taxes include, but are not limited to, the following: FICA (Social Security), unemployment insurance contributions, income tax, disability insurance, and workers' compensation insurance. Notwithstanding the foregoing, if CONTRACTOR is using a non-California address or a California P.O. Box address for conducting its business with COUNTY, CONTRACTOR shall be subject to required nonresident withholding for Services that CONTRACTOR provides in California for COUNTY, unless CONTRACTOR is a government entity or CONTRACTOR provides COUNTY with a California withholding form that shows CONTRACTOR is exempt from withholding.

5. **CONFLICT OF INTEREST.** CONTRACTOR covenants that CONTRACTOR presently has no employment or interest, and CONTRACTOR shall not acquire any employment or interest, direct or indirect, which would conflict in any manner or degree with the performance of Services required to be performed under this Contract. CONTRACTOR further covenants that in the performance of this Contract, CONTRACTOR will not employ any person or subcontractor having any such conflict interest. CONTRACTOR shall promptly disclose to COUNTY, in writing, any potential conflict of interest.

6. **OWNERSHIP AND INTELLECTUAL PROPERTY.**

   A. CONTRACTOR and its licensors are, and shall remain, the sole and exclusive owners of all right, title and interest in and to all documents, data, know-how, methodologies, software and other materials, including computer programs, reports and specifications, provided by or used by CONTRACTOR in connection with performing the Services to the extent developed or acquired by CONTRACTOR prior to the commencement or independently of this Contract (collectively, the "Pre-Existing Materials"), including all intellectual property rights therein.

   B. Except as provided in Subsection A of this Section 6, above, COUNTY shall own all Deliverables provided to COUNTY in connection with the Services. CONTRACTOR hereby grants to COUNTY a fully-paid, perpetual license to copy, adapt, perform, display, publish, disclose, distribute, create derivative works from, and otherwise use, in whole or in part, all Pre-Existing Materials incorporated into any of the Services or Deliverables, and all other reports, data, documents and other materials comprising, and necessary for COUNTY's continued use of, the Services and Deliverables, whether or not performance under this Contract is completed or terminated prior to completion ("License"). CONTRACTOR agrees to take such actions and execute and deliver such documents as may be needed to validate, protect and confirm the rights provided by this Section 6.B. In addition to and without limiting the provisions of the Indemnification and Insurance Requirements (defined below), CONTRACTOR warrants that none of the Deliverables, Services, or any other items provided by or on behalf of CONTRACTOR under this Contract shall infringe upon any intellectual property or proprietary rights of any third party. CONTRACTOR at its own expense shall defend, indemnify, and hold harmless COUNTY against all claims that any of the Deliverables, Services, or any other items provided by or on behalf of CONTRACTOR under this Contract infringe upon intellectual or other proprietary rights of a third party, and CONTRACTOR shall pay any damages, costs, settlement amounts, and fees (including attorneys' fees) that may be incurred by COUNTY in connection with any such claims.

C. This Section 6 shall survive the expiration or termination of this Contract.

7. **COUNTY PROPERTY.** COUNTY's property, documents, data, and information (collectively, "COUNTY Property") provided for CONTRACTOR's use or otherwise made available to CONTRACTOR or to which CONTRACTOR or any of CONTRACTOR's employees, affiliates, or subcontractors has access in connection with the Services, shall remain COUNTY's property, and CONTRACTOR shall return and destroy all copies of any and all COUNTY Property at the direction of COUNTY. CONTRACTOR may use COUNTY Property only to the extent necessary to provide the Services. CONTRACTOR shall not disseminate or disclose any COUNTY Property, without COUNTY's prior written consent in each instance. All non-public, confidential or proprietary information of COUNTY (collectively, "Confidential Information") disclosed, or made available to, or otherwise accessed by or on behalf of CONTRACTOR, whether disclosed orally or disclosed or accessed in written, electronic or other form or media, and whether or not marked, designated or otherwise identified as "confidential," in connection with the provision of the Services and this CONTRACT is confidential, and shall not be disclosed or copied by CONTRACTOR without the prior written consent of COUNTY in each instance. Confidential Information does not include information that is in the public domain or rightfully obtained by CONTRACTOR on a non-confidential basis from a third party. CONTRACTOR may use Confidential Information only to the extent necessary to provide the Services. This Section 7 shall survive the expiration or termination of this Contract.

8. **RECORDS, AUDIT, AND REVIEW.** CONTRACTOR must keep such business records pursuant to this Contract as would be kept by a reasonably prudent practitioner of CONTRACTOR's profession, and will maintain those records for at least four (4) years following the termination of this Contract. All accounting records must be kept in accordance with generally accepted accounting practices. COUNTY will have the right to audit and review all such documents and records at any time during CONTRACTOR's regular business hours or upon reasonable notice. In addition, if this Contract exceeds ten thousand dollars ($10,000.00), CONTRACTOR shall be subject to the examination and audit of the California State Auditor, at the request of the COUNTY or as part of any audit of the COUNTY, for a period of three (3) years after final payment under the Contract (Cal. Govt. Code Section 8546.7). CONTRACTOR shall participate in any audits and reviews, whether by COUNTY or the State, at no charge to COUNTY.

9. **INSURANCE AND INDEMNIFICATION.** CONTRACTOR agrees to and shall at all times during the term of the Contract fully comply with the Indemnification and Insurance Requirements attached to the Purchase Order and incorporated herein by reference ("Indemnification and Insurance Requirements"). The indemnification provisions set forth in the Indemnification and Insurance Requirements shall survive the expiration or termination of the Contract.

10. **NONDISCRIMINATION.** The County's Unlawful Discrimination Ordinance (Article XIII of Chapter 2 of the Santa Barbara County Code) applies to this Contract and is incorporated into the Contract by this reference with the same force and effect as if the ordinance were specifically set out herein, and CONTRACTOR agrees to comply with such ordinance.

11. **NONEXCLUSIVE AGREEMENT.** CONTRACTOR understands that this is not an exclusive Contract, and that COUNTY has the right to negotiate with and enter into contracts with others providing the same or similar services as those CONTRACTOR provides.

12. **NON-ASSIGNMENT; PERMITTED SUBCONTRACTOR(S).** CONTRACTOR shall not assign, delegate, subcontract, or otherwise transfer, by operation of law or otherwise, this Contract or any of CONTRACTOR's rights or obligations under this Contract without COUNTY's prior written consent in each instance, and any attempt to so assign or so transfer without such consent shall be void and without legal effect and shall constitute grounds for immediate termination of this Contract by COUNTY. CONTRACTOR shall not enter into agreements with or otherwise engage any person or entity, including all subcontractors and affiliates of CONTRACTOR, other than CONTRACTOR's employees, to provide any Services to Customer without the prior written consent of COUNTY in each instance (each such approved subcontractor or other third party, a "Permitted Subcontractor"). COUNTY's consent with respect to a Permitted Subcontractor shall not relieve CONTRACTOR of any of its obligations under the CONTRACT, and CONTRACTOR shall remain fully responsible for the performance of each such Permitted Subcontractor and its employees and for their compliance with all of the terms and conditions of this Contract as if they were CONTRACTOR's own employees. CONTRACTOR shall ensure that all persons, whether employees, agents, subcontractors, or anyone acting for or on behalf of CONTRACTOR, are properly licensed, certified and accredited as required by applicable law and are suitably skilled, experienced and qualified to perform the Services. CONTRACTOR shall require each Permitted Subcontractor to be bound in writing by the confidentiality and intellectual property assignment and license provisions of these Terms and Conditions. Nothing contained in this Contract shall create any contractual relationship between COUNTY and any subcontractor or supplier of CONTRACTOR.

13. **TERMINATION.**

A. By COUNTY. COUNTY may, by written notice to CONTRACTOR, terminate this Contract in whole or in part at any time, whether for COUNTY's convenience, for non-appropriation of funds, or because of the failure of CONTRACTOR to fulfill the obligations herein.

1. **For Convenience**. COUNTY may terminate this Contract in whole or in part upon thirty (30) days' written notice. During such thirty (30) day period, CONTRACTOR shall, as directed by COUNTY, wind down and cease the performance of Services as quickly and efficiently as reasonably possible, without performing unnecessary Services or activities and by minimizing negative effects on COUNTY from such winding down and cessation of Services.

2. **For Non-appropriation of Funds**. Notwithstanding any other provision of this Contract, in the event that no funds or insufficient funds are appropriated or budgeted by federal, state or COUNTY governments, or funds are not otherwise available for payments in the fiscal year(s) covered by the term of this Contract, then COUNTY will notify CONTRACTOR of such occurrence and COUNTY may terminate or suspend this Contract in whole or in part, with or without a prior notice period. Subsequent to termination of this Contract under this provision, COUNTY shall have no obligation to make payments with regard to the remainder of the term of the Contract.
3. **For Cause**. Should CONTRACTOR default in the performance of this Contract or materially breach any of its provisions, COUNTY may, at COUNTY's sole option, terminate or suspend this Contract in whole or in part immediately upon written notice to CONTRACTOR. Upon receipt of such termination or suspension notice, CONTRACTOR shall immediately discontinue all Services (unless such notice directs otherwise) and notify COUNTY as to the status of its CONTRACTOR's performance of

CONTRACTOR's obligations under this Contract. The date of termination shall be the date such notice is received by CONTRACTOR, unless such notice directs otherwise.

B. By CONTRACTOR. Should COUNTY fail to pay CONTRACTOR all or any part of the payment set forth in the Description of Services, CONTRACTOR may, at CONTRACTOR's option terminate this Contract if such failure is not remedied by COUNTY within thirty (30) days of written notice to COUNTY of such late payment.

C. Upon termination, CONTRACTOR shall deliver to COUNTY all COUNTY Property and all Deliverables, whether completed or in process, except such items as COUNTY may, by written permission, permit CONTRACTOR to retain. Notwithstanding any other payment provision of this Contract, COUNTY shall pay CONTRACTOR for satisfactory Services performed prior to the date of such termination in a prorated amount of the compensation due hereunder, less payments, if any, previously made by COUNTY to CONTRACTOR. In no event shall CONTRACTOR be paid an amount in excess of the full price under this Contract, nor for profit on unperformed portions of Services. CONTRACTOR shall furnish to COUNTY such financial information as in the judgment of COUNTY is necessary to determine the reasonable value of the Services rendered by CONTRACTOR. In the event of a dispute as to the reasonable value of the Services rendered by CONTRACTOR, the decision of COUNTY shall be final. The foregoing is cumulative and shall not affect any right or remedy which COUNTY may have in law or equity.

14. **NOTICE.** *From CONTRACTOR:* CONTRACTOR must send or deliver any required notice to the Designee at the addresses specified for COUNTY set forth in the Purchase Order. *From COUNTY:* Designee must send or deliver any required notice to CONTRACTOR at the address set forth in the first paragraph of these Terms and Conditions, above. Notices mailed by US Postal Service first-class, receipt of which is unacknowledged, shall be deemed effective three days from date of mailing. Other notices shall be deemed effective upon delivery by hand, proof of delivery by nationally recognized overnight carrier, or written acknowledgement of receipt, whichever is earlier.

15. **ENTIRE AGREEMENT AND AMENDMENT.** This Contract contains the entire understanding and agreement of the Parties with respect to the subject matter hereof and supersedes all prior or contemporaneous understandings, agreements, negotiations, representations and warranties, and communications, both written and oral, and there have been no promises, representations, agreements, warranties or undertakings by any of the Parties, either oral or written, of any character or nature hereafter binding except as set forth herein. This Contract may be altered, amended or modified only by an instrument in writing (duly executed by Designee and/or COUNTY's Chief Procurement Officer or designee) and by no other means. Each Party waives their future right to claim, contest or assert that this Contract was modified, canceled, superseded, or changed by any oral agreements, course of conduct, waiver or estoppel. This Contract expressly conditions CONTRACTOR's acceptance on CONTRACTOR's agreement to these Terms and Conditions. These Terms and Conditions shall control and prevail over any terms and conditions contained in any other documentation, and expressly exclude all of CONTRACTOR's general terms and conditions, if any, and any other document issued by CONTRACTOR in connection with the Contract unless such document is duly executed by COUNTY.

16. **COMPLIANCE WITH LAW.** CONTRACTOR shall, at its sole cost and expense, comply with all applicable County, State, and Federal statutes, ordinances, and regulations in effect during the Term of this Contract. The judgment of any court of competent jurisdiction, or the admission of CONTRACTOR in any action or proceeding against CONTRACTOR, whether COUNTY is a party thereto or not, that CONTRACTOR has violated any such ordinance or statute, shall be conclusive of that fact as between CONTRACTOR and COUNTY. Before the date on which the Services are to start, CONTRACTOR shall obtain and, at all times during the term of this Contract, maintain, all necessary licenses, permits, and consents applicable to the provision of the Services. CONTRACTOR shall comply with all rules, regulations and policies of COUNTY, including security procedures concerning systems and data and remote access thereto, building security procedures, including, but not limited to, the restriction of access by CONTRACTOR to certain areas of COUNTY premises or systems for security reasons, and general health and safety practices and procedures.

17. **CALIFORNIA LAW.** This Contract is governed by the laws of the State of California. Any litigation regarding this Contract or its contents must be filed in the County of Santa Barbara, if in state court, or in the federal district court nearest to Santa Barbara County, if in federal court.

18. **ORDER OF PRECEDENCE.** Any ambiguity, conflict, or inconsistency between the documents comprising this Contract shall be resolved according to the following order of precedence: (1) the Indemnification and Insurance Requirements; (2) these Terms and Conditions; (3) the Purchase Order; (4) the Description of Services, (4) any other Contract Documents comprising the Contract (a) as attachments to the Purchase Order, or (b) duly executed by both of the Parties after CONTRACTOR's acceptance of the Purchase Order.

19. **DEBARMENT AND SUSPENSION.** CONTRACTOR certifies to COUNTY that none of CONTRACOR and CONTRACTOR's employees and principals are debarred, suspended, or otherwise excluded from or ineligible for, participation in federal, state, or county government contracts. CONTRACTOR shall not contract with any subcontractor that is so debarred or suspended.

20. **NO PUBLICITY OR ENDORSEMENT.** CONTRACTOR shall not use COUNTY's name or logo or any variation of such name or logo in any publicity, advertising or promotional materials. CONTRACTOR shall not use COUNTY's name or logo in any manner that would give the appearance that COUNTY is endorsing CONTRACTOR. CONTRACTOR shall not in any way contract on behalf of or in the name of COUNTY. CONTRACTOR shall not release any informational pamphlets, notices, press releases, research reports, or similar public notices or statements regarding COUNTY or its projects, without the prior written consent of COUNTY in each instance.

21. **SEVERABILITY.** If any one or more of the provisions contained herein shall for any reason be held to be invalid, illegal or unenforceable in any respect, then such provision or provisions shall be deemed severable from the remaining provisions hereof, and such invalidity, illegality or unenforceability shall not affect any other provision hereof, and this Contract shall be construed as if such invalid, illegal or unenforceable provision had never been contained herein.

22. **REMEDIES NOT EXCLUSIVE.** No remedy herein conferred upon or reserved to COUNTY is intended to be exclusive of any other remedy or remedies, and each and every such remedy, to the extent permitted by law, shall be cumulative and in addition to any other remedy given hereunder or now or hereafter existing at law or in equity or otherwise.

23. **SURVIVAL.** All provisions of this Contract which by their nature are intended to survive the termination or expiration of this Contract shall survive such termination or expiration.

24. **NO WAIVER.** No delay or omission of COUNTY to exercise any right or power arising upon the occurrence of any event of default shall impair any such right or power or shall be construed to be a waiver of any such default or an acquiescence therein; and every power and remedy given by this Contract to COUNTY shall be exercised from time to time and as often as may be deemed expedient in the sole discretion of COUNTY.

25. **SUCCESSORS AND ASSIGNS.** These Terms and Conditions shall be binding upon and inure to the benefit of the parties hereto and their respective successors and permitted assigns in accordance with these Terms and Conditions.

26. **EXECUTION IN COUNTERPARTS; AUTHORITY.** The Contract and these Terms and Conditions may be executed in counterparts and each shall be deemed an original, and all shall constitute the same instrument. Each of the Parties represents and warrants that such Party's respective signatories to the Contract have the power and authority to enter into this Contract in the capacities set forth in the Purchase Order, and such Party has fully complied with all formal requirements necessary for such Party to enter into this Contract and for this Contract to be legally binding on such Party. CONTRACTOR hereby certifies and warrants that entering into this Contract shall not cause CONTRACTOR to breach the terms or conditions of any other contract or agreement to which CONTRACTOR is a party or which is otherwise binding on CONTRACTOR.

EXHIBIT C

Indemnification and Insurance Requirements
(For Professional Contracts)

INDEMNIFICATION

CONTRACTOR agrees to indemnify, defend (with counsel reasonably approved by COUNTY) and hold harmless COUNTY and its officers, officials, employees, agents and volunteers from and against any and all claims, actions, losses, damages, judgments and/or liabilities arising out of this Agreement from any cause whatsoever, including the acts, errors or omissions of any person or entity and for any costs or expenses (including but not limited to attorneys' fees) incurred by COUNTY on account of any claim except where such indemnification is prohibited by law. CONTRACTOR'S indemnification obligation applies to COUNTY'S active as well as passive negligence but does not apply to COUNTY'S sole negligence or willful misconduct.

NOTIFICATION OF ACCIDENTS AND SURVIVAL OF INDEMNIFICATION PROVISIONS

CONTRACTOR shall notify COUNTY immediately in the event of any accident or injury arising out of or in connection with this Agreement. The indemnification provisions in this Agreement shall survive any expiration or termination of this Agreement.

INSURANCE

CONTRACTOR shall procure and maintain for the duration of this Agreement insurance against claims for injuries to persons or damages to property which may arise from or in connection with the performance of the work hereunder and the results of that work by the CONTRACTOR, its agents, representatives, employees or subcontractors.

A. Minimum Scope of Insurance
Coverage shall be at least as broad as:

1. **Commercial General Liability (CGL):** Insurance Services Office (ISO) Form CG 00 01 covering CGL on an "occurrence" basis, including products-completed operations, personal & advertising injury, with limits no less than $1,000,000 per occurrence and $2,000,000 in the aggregate.
2. **Automobile Liability**: Insurance Services Office Form Number CA 0001 covering, Code 1 (any auto), or if CONTRACTOR has no owned autos, Code 8 (hired) and 9 (non-owned), with limit no less than $1,000,000 per accident for bodily injury and property damage.
3. **Workers' Compensation**: Insurance as required by the State of California, with Statutory Limits, and Employer's Liability Insurance with limit of no less than $1,000,000 per accident for bodily injury or disease. ***(Not required if CONTRACTOR provides written verification that it has no employees)***
4. **Professional Liability:** (Errors and Omissions) Insurance appropriates to the CONTRACTOR'S profession, with limit no less than $2,000,000 per occurrence or claim, $2,000,000 aggregate.

If the CONTRACTOR maintains broader coverage and/or higher limits than the minimums shown above, the COUNTY requires and shall be entitled to the broader coverage and/or the higher limits maintained by the CONTRACTOR. Any available insurance proceeds in excess of the specified minimum limits of insurance and coverage shall be available to the COUNTY.

B. Other Insurance Provisions
The insurance policies are to contain, or be endorsed to contain, the following provisions:

1. **Additional Insured** – COUNTY, its officers, officials, employees, agents and volunteers are to be covered as additional insureds on the CGL policy with respect to liability arising out of work or operations performed by or on behalf of the CONTRACTOR including materials, parts, or equipment furnished in connection with such work or operations. General liability coverage can be provided in the form of an endorsement to the CONTRACTOR'S insurance at least as broad as ISO Form ISO Form CG 20 10 11 85 or both CG 20 10, CG 20 26, CG 20 33, or CG 20 38; **and** CG 20 37 forms if later revisions used).
2. **Primary Coverage** – For any claims related to this contract, the CONTRACTOR'S insurance coverage shall be primary insurance primary coverage at least as broad as ISO CG 20 01 04 13 as respects the COUNTY, its officers, officials, employees, and volunteers. Any insurance or self-insurance maintained by the COUNTY, its officers, officials, employees, or volunteers shall be excess of the CONTRACTOR'S insurance and shall not contribute with it.
3. **Notice of Cancellation** – Each insurance policy required above shall provide that coverage shall not be canceled, except with notice to the COUNTY.
4. **Waiver of Subrogation Rights** – CONTRACTOR hereby grants to COUNTY a waiver of any right to subrogation which any insurer of said CONTRACTOR may acquire against the COUNTY by virtue of the payment of any loss under such insurance. CONTRACTOR agrees to obtain any endorsement that may be necessary to effect this waiver of subrogation, but this provision applies regardless of whether or not the COUNTY has received a waiver of subrogation endorsement from the insurer.
5. **Deductibles and Self-Insured Retention** – Any deductibles or self-insured retentions must be declared to and approved by the COUNTY. The COUNTY may require the CONTRACTOR to purchase coverage with a lower deductible or retention or provide proof of ability to pay losses and related investigations, claim administration, and defense expenses within the retention.
6. **Acceptability of Insurers** – Unless otherwise approved by Risk Management, insurance shall be written by insurers authorized to do business in the State of California and with a minimum A.M. Best's Insurance Guide rating of "A- VII".
7. **Verification of Coverage** – CONTRACTOR shall furnish the COUNTY with proof of insurance, original certificates and amendatory endorsements as required by this Agreement. The proof of insurance, certificates and endorsements are to be received and approved by the COUNTY before work commences. However, failure to obtain the required documents prior to the work beginning shall not waive the CONTRACTOR'S obligation to provide them. The CONTRACTOR shall furnish evidence of renewal of coverage throughout the term of the Agreement. The COUNTY reserves the right to require complete, certified copies of all required

insurance policies, including endorsements required by these specifications, at any time.

8. **Failure to Procure Coverage** – In the event that any policy of insurance required under this Agreement does not comply with the requirements, is not procured, or is canceled and not replaced, COUNTY has the right but not the obligation or duty to terminate the Agreement. Maintenance of required insurance coverage is a material element of the Agreement and failure to maintain or renew such coverage or to provide evidence of renewal may be treated by COUNTY as a material breach of contract.
9. **Subcontractors** – CONTRACTOR shall require and verify that all subcontractors maintain insurance meeting all the requirements stated herein, and CONTRACTOR shall ensure that COUNTY is an additional insured on insurance required from subcontractors.
10. **Claims Made Policies** – If any of the required policies provide coverage on a claims-made basis:
    i. The Retroactive Date must be shown and must be before the date of the contract or the beginning of contract work.
    ii. Insurance must be maintained and evidence of insurance must be provided for at least five (5) years after completion of contract work.
    iii. If coverage is canceled or non-renewed, and not replaced with another claims-made policy form with a Retroactive Date prior to the contract effective date, the CONTRACTOR must purchase “extended reporting” coverage for a minimum of five (5) years after completion of contract work.
11. **Special Risks or Circumstances** – COUNTY reserves the right to modify these requirements, including limits, based on the nature of the risk, prior experience, insurer, coverage, or other special circumstances.

Any change requiring additional types of insurance coverage or higher coverage limits must be made by amendment to this Agreement. CONTRACTOR agrees to execute any such amendment within thirty (30) days of receipt.

Any failure, actual or alleged, on the part of COUNTY to monitor or enforce compliance with any of the insurance and indemnification requirements will not be deemed as a waiver of any rights on the part of COUNTY.