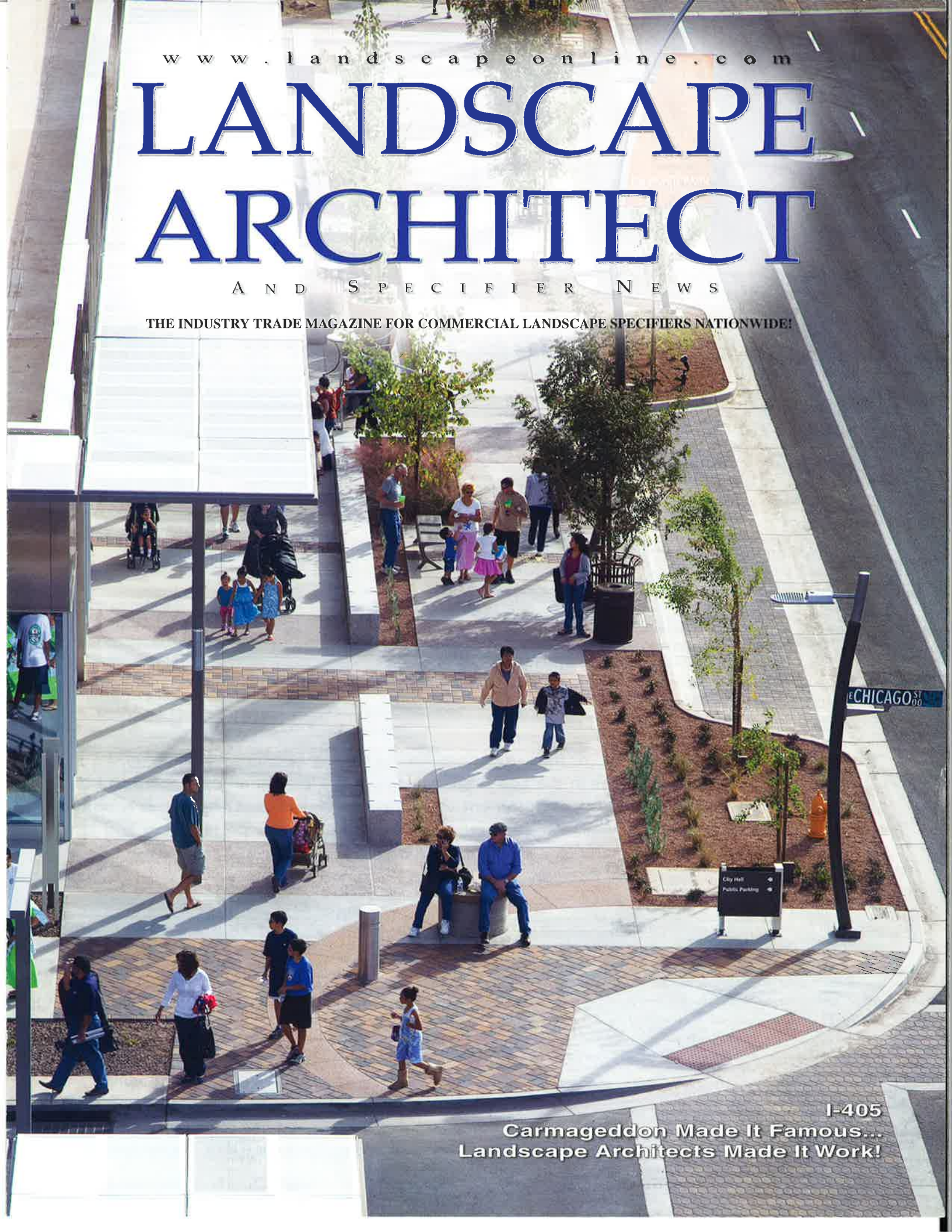


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I-405
Carmageddon Made It Famous...
Landscape Architects Made It Work!

I-405

Carnageddon Made it Famous . . . Landscape Architects Made It Work!

Tim Mann, RLA, Principal, Visual Quality Manager/Project Manager, Lynn Capouya, Inc.

Stephen Kelly, Editor



Interstate 405 (I-405) is a major freeway access route for the coastal, westside, and San Fernando Valley communities in the Los Angeles area. It is also the primary route to L.A. International Airport. It's an understatement to say this freeway is subject to heavy usage and experiences considerable vehicular congestion. The purpose of this project is to add a high occupancy vehicle (HOV) lane to the northbound direction of the I-405 from West Los Angeles, through the Sepulveda Pass and into the San Fernando Valley.

The project spans nearly 10 miles of state highway. The project will achieve its goal by reconfiguring access and exit ramps, standardizing lane widths and incorporating other highway and local street improvements necessary for safe vehicle access and passage.

Editor's note: As this article was put to the page, L.A. area drivers were being warned of the dire peril awaiting them during the July 16-17 weekend shutdown of 10 miles of the 405 Freeway for overpass construction. It was being called "carnageddon." Turns out, it was no big deal for area drivers, and the 405 Freeway reopened ahead of schedule.

Lynn Capouya, Inc. (LCI) of Irvine, Calif. performed duties of visual quality manager and consulting landscape architect for this nearly \$1 billion transportation project. The project scope includes widening 23 roadway bridges and construction of over 100

retaining walls to support the widening of the highway within the existing state highway right-of-way. The bridge construction efforts include the replacement of three overcrossing structures (at Sunset Boulevard, Skirball Center Drive and Mulholland Drive), and widening of 14 undercrossings. The retaining wall construction types are varied and are assigned based upon the existing geotechnical conditions. The construction types include mechanically stabilized earth (MSE) panels, cast-in-place, soil nail, and tie-back structures (see Retaining Wall side bar on the facing page.)

Visual Quality Management

LCI is responsible for the administrative coordination of the Visual Quality Management Advisory Team (VQMAT) and Community Advisory Committee (CAC). The team members

Retaining Walls

The addition of a high-occupancy vehicle (HOV) lane, and the resulting increase in the cross-section of the highway, requires a physical change to the support structure for the highway, including retaining walls. Retaining walls occur in a variety of heights and construction types. These walls are, generally, mechanically stabilized earth (MSE) panel walls and constructed of precast panels, installed in a staggered pattern, with a decorative texture formed into the exposed surface. The walls, constructed adjacent to highway shoulders, have a concrete barrier installed immediately above the retaining portion of the structure. In the more noise sensitive locations, the walls are designed with sound walls incorporated into the barrier rail. LCI provided the analysis of the existing sound wall aesthetics and designed the proposed wall to complement existing structures within the corridor. LCI coordinated with Caltrans to facilitate agency approvals of the conceptual aesthetic design of the retaining walls. In many of the areas, the widening of the facility will result in a reduction of planting areas within the highway right-of-way. Also, LCI coordinated with Caltrans and the city of Los Angeles to maximize the available planting areas adjacent to the retaining walls. LCI participated with the Los Angeles County Metropolitan Transit Authority in a series of public meetings to present the wall designs and planting concepts, and responded to community commentary.

As the highway facility traverses the Sepulveda Pass, the roadway is geographically located below the adjacent slope topography. The proposed retaining structures are primarily soil nail walls anchored to the surrounding slopes. This construction method requires a multi-step installation and culminates with a concrete finish surface simulating the surrounding rock slopes in the vicinity. LCI participated in the coordination and selection of the surface texture and color, and performed field inspections and approval of test panels.

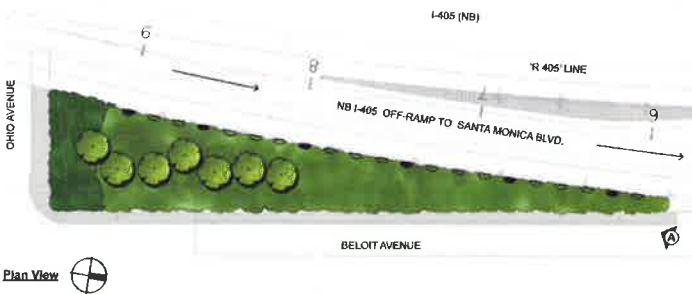
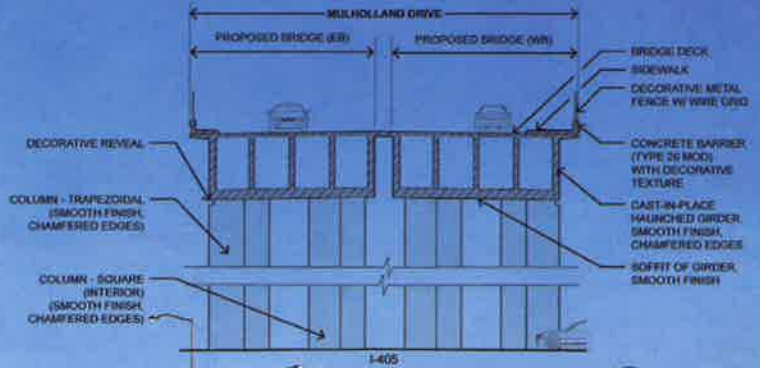
Retaining walls will be constructed using a variety of methods and materials:

Drawing, above: The project spans a 10-mile stretch of the 405 Freeway from West Los Angeles, through the Sepulveda Pass and into the San Fernando Valley. The connection of the 405 Freeway and Wilshire Boulevard is a major access point to UCLA, Bel Air, Westwood Village, Brentwood Glen and the Wilshire Boulevard Business District. Caltrans recommended storm water detention basins for the loop ramps on the west side of the highway. The loop ramps at Wilshire Boulevard required significant grading to accommodate the necessary storm water capacity. LCI provided planting recommendations for the basins and the surrounding slopes. For seasonal maintenance, Caltrans recommended removal of any trees or shrubs within these basins, which made it a challenge to adequately screen areas from the state highway, surrounding city streets, access ramp facilities and private property.

Simulation, above right: A visual simulation of a mechanically stabilized earth (MSE) wall shows the bottom half of the wall (the retaining portion) with the basic finish—a 1.5-inch fractured-fin texturing and panels installed with a half-panel vertical offset. Walls constructed adjacent to highway shoulders have a concrete barrier installed immediately above the retaining portion of the structure. The wall extension above that is a sound wall of CMU blocks with decorative pilasters.

Simulation, bottom right: All of the sound walls, which will generally be 14 feet tall, will be constructed of CMUs in a bond pattern, with "four score" blocks placed in single block rows one block down from the top and one block up from the bottom of the concrete barrier. There are four aesthetic treatments for the sound walls.





Above and mechanical drawing: Conceptual visual simulation (south elevation). An iconic symbol of the 1950s Los Angeles automobile culture, the Mulholland Bridge provides a symbolic entry and exit to and from West Los Angeles and the San Fernando Valley. The bridge character is consistent with bridge construction of the era and has been a point-of-interest for more than 50 years. The new bridge structure will be consistent with the original design concept and provide the necessary additional traffic capacity, plus meet seismic standards. LCI was responsible for the selection and design of plant materials consistent with those indigenous to the area, acceptable to the Mulholland Scenic Design Guidelines, and maintainable by Caltrans. LCI coordinated with adjacent homeowners associations, cultural centers, fire authority and governing agencies to develop a planting and irrigation design that meets the requirements of all constituents.

Simulation inset left: The project area traverses many West Los Angeles communities. The widening of the highway facility within the existing right-of-way boundaries requires the modification or addition of retaining wall structures or changes to adjacent slope areas to accommodate the existing highway profile. In some locations (Beloit Ave. here) the additional highway capacity requires sound walls. Proposed changes to off-pavement areas requires the design and coordination of retaining wall textures, sound wall block patterns and planting concepts to improve the character of the adjacent streets.

Above, rendering: Beloit Avenue (west side of the freeway), and Cotner Avenue (the east side) are adjacent to the Caltrans right-of-way and parallel the freeway. The off-pavement areas, located between the edge of state highway pavement and Los Angeles street right-of-way, are reduced. LCI identified the impacted planting areas and proposed design improvements. These planting improvements add tree, shrubs, ground cover and vines to visually screen the adjacent highway and improve the visual quality the city streets. The material selections meet Caltrans and the city of Los Angeles maintenance requirements.

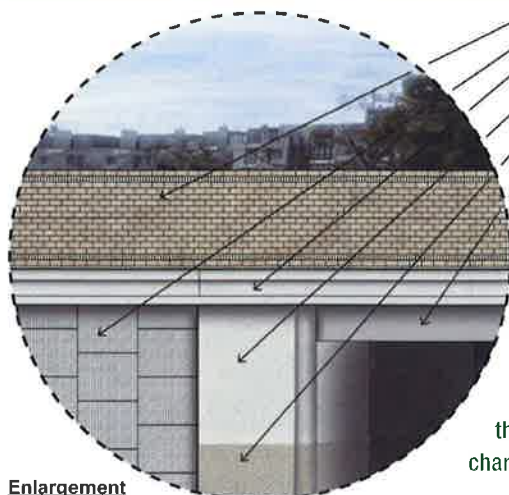
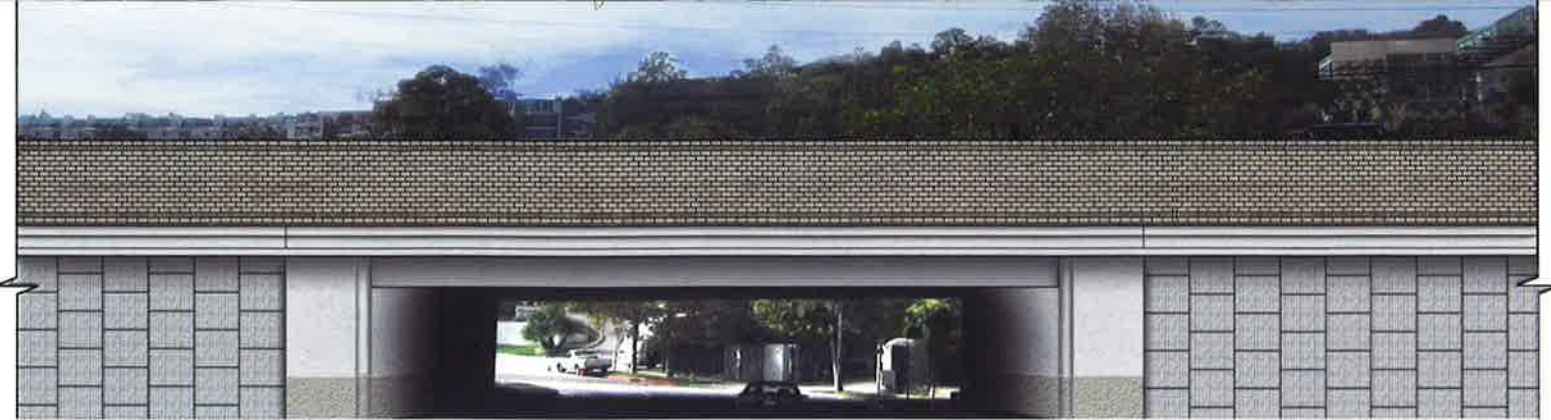
include the design builder, engineering and architectural consultants, stakeholder groups and affected agencies assembled to develop, approve and implement the Visual Quality Management Plan (Management Plan) and the Visual Quality Management Concept Plan (Concept Plan).

LCI developed the Management Plan, a general guidance document to identify, manage, administrate and resolve visual quality issues. The Management Plan addresses the responsibilities and procedures for the development, communication and approval of the aesthetic design solutions.

In addition, LCI developed the concept plan to address the specific visual quality areas. It communicates the approved

aesthetic concepts and provides conceptual design guidance during design development and final design phases.

The VQMAT reviews design options and recommended measures to mitigate adverse visual impacts resulting from construction. The VQMAT provided design guidance specific to aesthetic solutions for bridge replacements, bridge widening, retaining and sound walls, slope and gore paving and other highway components. The project requires ongoing coordination with multiple governmental agencies, including Los Angeles County Metropolitan Transportation Authority (METRO), Caltrans, county and city of Los Angeles and a number of surrounding communities and residential neighborhoods.



- SOUND WALL
- RETAINING WALL (PRECAST PANEL)
- BRIDGE BARRIER RAIL (TYPE 736 MOD W/ NOTCH)
- ABUTMENT (ROUNDED EDGE)
- TEXTURED CONCRETE SURFACE
- GIRDER

Enlargement

PROPOSED IMPROVEMENTS

To accomplish the necessary widening for the freeway, the design builder is required to widen many bridge structures along the route. The project is widening 13 undercrossings (the Church Lane undercrossing here). The undercrossings have a consistent design character developed during the original highway construction. The intent of the design is to protect this character and facilitate the development of additional design elements to improve upon the visual continuity of the corridor. LCI identified the more significant design elements of the structures and recommended incorporation of these elements into the proposed design. The abutment, abutment wing walls, concrete bridge deck and barrier rails, sound walls and other bridge components are the primary design features at each location. At most locations, only one direction of the highway is identified for widening. At these locations, LCI identified the design opportunities and recommended proposed improvements enhancing the existing character of the structure.

arborist collaborated to identify the plant material for removal.

Following the site analysis, LCI recommended design solutions sensitive to the existing environment and level of urbanization surrounding the highway facility. LCI developed the overall planting concept emphasizing the use of trees, as the primary design element, in conjunction with a combination of prostrate shrubs and ground covers. The placement of trees will emphasize and visually reinforce the geometry of the highway facility and present as significant vertical elements in the corridor. The use of shrubs and ground covers will minimize erosion and the resulting sedimentation, while bringing additional visual interest.

Drought Tolerant Plants

The proposed plant materials are drought tolerant, low maintenance and possess an extended longevity for the identified geographical area. Where installation of container of plant material is not preferred, the minimum treatment for these disturbed areas is mechanically broadcast hydroseed mixes. Included in the construction documentation, there are three different hydroseed mixes selected dependent upon their functional requirement and site conditions. The proposed highway landscape design satisfies the requirements of the California Department of Transportation (Caltrans). These requirements address the site remediation, revegetation, erosion control, storm water pollution prevention, traffic safety and fire suppression.

Throughout the project corridor detention basins and bioswales are proposed at numerous locations. The basins are considered storm water best management practices (BMP) and located in areas identified as optimal for detention, or interrupted flow, of storm water or surface run-off. The basins and bioswales are permeable, allowing suspended pollutants and sediments to be filtered or dispersed, resulting in a reduction in storm water pollution. These basin features will receive a vegetative coverage of low growing, native perennial grass species installed over

Highway Planting

With all the construction, the existing vegetation will be significantly altered. As consulting landscape architects, LCI was responsible for the identification and incorporation of the aesthetic goals, objectives and challenged to achieve a unified planting design theme for the corridor.

Early on, LCI performed site review and observational procedures to identify the unique regions impacted by the proposed highway construction. The design of the areas located throughout West Los Angeles (Region 1) has an urban character, with the proposed landscape improvements framing the more desirable highway features and screening objectionable views. Because of the elevated condition of the highway through the area, the adjacent landscape areas in this region are primarily viewed from the surrounding city streets. The landscape improvements are intended to enhance the aesthetics of the bridge and wall structures, while reducing their visual scale.

The geographical areas within the Sepulveda Pass (Region 2) are considered more transitional and visually reflect the adjacency to the Santa Monica Mountain Conservancy. The highway is primarily constructed below the surrounding grade. Travelers view this landscape going to and from the San Fernando Valley. The landscape improvements are intended to remediate and revegetate the areas impacted by construction operations throughout this area.

Enter the Arborist

Within the entire project area, LCI coordinated with the consultant arborist to identify existing vegetative assets and analyze approximately 5,500 existing trees and shrubs potentially impacted by the proposed construction. The trees were surveyed, identified and graded for protection, preservation or removal, a huge undertaking. LCI and the

(Retaining Walls, continued from page 3)

Cast-in-place Concrete Walls

- Smooth concrete finish and roughened texture lower band for walls in L.A. right-of-ways.
- Form liners with a griddle fractured-fin pattern for state right-of-ways.
- Walls parallel and immediately adjacent to bridge abutment walls will get the same aesthetic treatment as the bridge abutment wall.

Mechanically Stabilized Earth (MSE) Walls

- MSE panels get a 1.5 inch fractured-fin texture. Standard panels will be 5-ft. vertical by 6-ft. horizontal, installed with a half-panel vertical offset. Coping and moment slab edges will have a smooth concrete finish. Top of walls get either a concrete barrier or a cable railing.

Soil Nail Walls

- Soil nail retaining wall construction consists of cutting back the slope from the top down, drilling soil nail anchors into the slope, placement of steel reinforcing bars and spraying the area with cement grout or shotcrete. Cable railings will go at the top of these walls.

Finishes include

- A simulated rock formation along the freeway, with horizontal and vertical stratifications, sculpting outcroppings, applying base stain, highlighting and anti-graffiti coating. Inverted crevassing will discourage climbing "enthusiasts." The color scheme will match the hillside and blend with the vegetation.
- The shotcrete is given a steel-trowel finish for a smooth concrete finish look. A roughened texture band is then added to the lower area of these walls as graffiti deterrents.
- For soil nail walls constructed adjacent to a bridge abutment or cast-in-place retaining wall, a one-sided form (and as needed a form liner) will be used to add a cast-in-place façade to the face of the wall.

Soldier Pile/Tie-Back Walls

- For soldier pile walls and other tie-back types, construction involves spraying the area with cement grout or shotcrete. Aesthetic treatments are that of soil nail walls.

Key Project Team Members

Owner:

Los Angeles County Metropolitan Transportation Authority (LACMTA)

Michael Barbour, Executive Officer,
Highway Project Management

Design-Build Contractor:

Kiewit Pacific Companies
Terry Robinson, Project Director

Consulting Civil Engineer:

HNTB
Michael Kraman, Design Manager

Consulting Landscape Architect:

Lynn Capouya, Inc.
Tim Mann, RLA, Principal,
Visual Quality Manager/Project Manager
Gerald Ohta, ASLA, Design Manager

Approving Public Agencies:

LACMTA
Caltrans
City of Los Angeles
County of Los Angeles
Neighborhood Associations



Agave americana



Aspidistra elatior



Carissa grandiflora 'Green Carpet'



Clivia minata



Heteromeles arbutifolia



Hydroseed mix



Platanus racemosa



Quercus agrifolia



Rhus ovata



Rosmarinus officinalis 'Prostratus'



Myrica californica



Ribes viburnifolium

Above photos: The overall planting concept focuses on trees to present a strong vertical element in the corridor. Shrubs and ground cover will provide erosion control and visually enhance the groundplane. The proposed plant species are drought tolerant, low maintenance and possess extended longevity. The project is divided into two distinct planting regions. West Los Angeles areas (Region 1) and Sepulveda Pass areas (Region 2). Region 1 plants are installed in the more urban and suburban areas and generally categorized "ornamental" and complementary to the existing plant palette. Region 2 plants are installed in more transitional and open space areas of the Sepulveda Pass and visually reflect the less developed character of the area and enhance the existing native plant communities. LCI recommended the use of both native and noninvasive ornamental plant species. In addition, LCI coordinated with Caltrans, the city of Los Angeles and the county of LA Fire Authority for selection of appropriate species for this region.

native soil. LCI performed coordination with seed nurseries to select appropriate material meeting the aesthetic and functional requirement of these features.

Irrigation Technology

LCI performed analysis of the existing irrigation systems and collaborated with Caltrans maintenance staff to include the most current technology for irrigation control and water resource management. LCI performed research and, when appropriate for the site conditions, selected two-wire irrigation control technology. This design option will facilitate cost efficient communication methods between the automatic irrigation controller and remote control valves. The technology will reduce repair and maintenance expenditures for the area and establish an option for future equipment improvements.