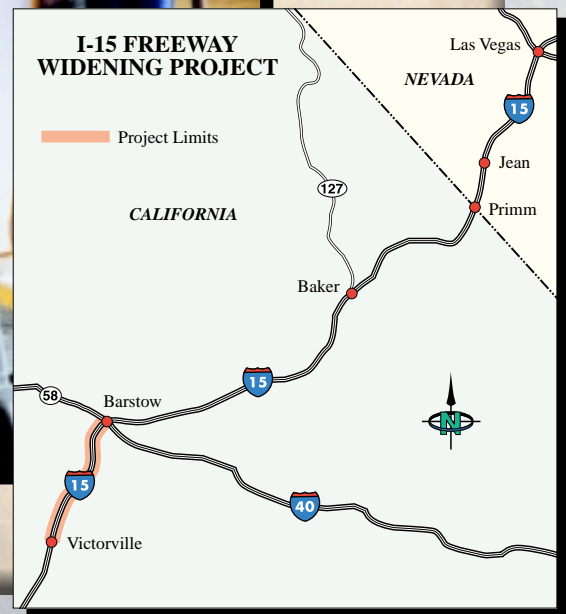


WORKING TOGETHER



The Director's Corner

**Tom Stephens, P.E. ,
Director**



Growth, Highways and Federal Funding

Ingrid Reisman, a spokeswoman for RTC of Southern Nevada, framed the challenges facing transportation professionals when she recently told a newspaper reporter: “The growth in Vegas is unprecedented. No one could have ever projected the kind of growth we have had and even if they had known, there’s not the funding or the resources to keep up with the growth.”

During the past decade, Nevada was far and away the nation’s fastest growing state. The growth rate exceeded 66% compared to second place Arizona at 40% and followed by Colorado, Utah and Idaho at around 30%. (See map on next page)

Although the greatest growth took place in Clark County, the rest of Nevada outside Clark County grew more than 35%, which is a higher rate than any other state except Arizona. This growth has placed tremendous pressure on Nevada’s highway system both in terms of increased congestion and increased wear and tear.

On the cover: *Govs. Kenny Guinn and Gray Davis get together for a groundbreaking in Fontana, Calif. The ceremony marked the beginning of a \$160 million project that will improve one of Nevada’s economic lifelines, Interstate 15 from southern California to Las Vegas.*

In the last ten years NDOT has completed many important capacity projects. These include new freeways through Henderson and south Truckee Meadows. The central Las Vegas Spaghetti Bowl was rebuilt and a major renovation of the Reno-Sparks Spaghetti Bowl will start this summer. The widening of the crowded US 95 corridor in northwest Las Vegas is well underway. Tremendous improvements have been accomplished on I-15 through the resort corridor with further widening to Primm.

To protect our economic lifeline, Nevada contributed to the reconstruction of the key I-15/I-40 interchange in

**“NDOT’s projects to
increase traffic
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Las Vegas Spaghetti
Bowl, and widening of
US 95 in Northwest
Las Vegas.”**

Barstow and to the widening of I-15 in California.

After more than ten years of environmental study, the Hoover Dam Bypass project is in design and the first construction is expected to begin this fall.

At the same time NDOT halted the decline in highway condition. A new maintenance management system identified the greatest needs and the most cost effective repair strategies. The highway maintenance backlog was

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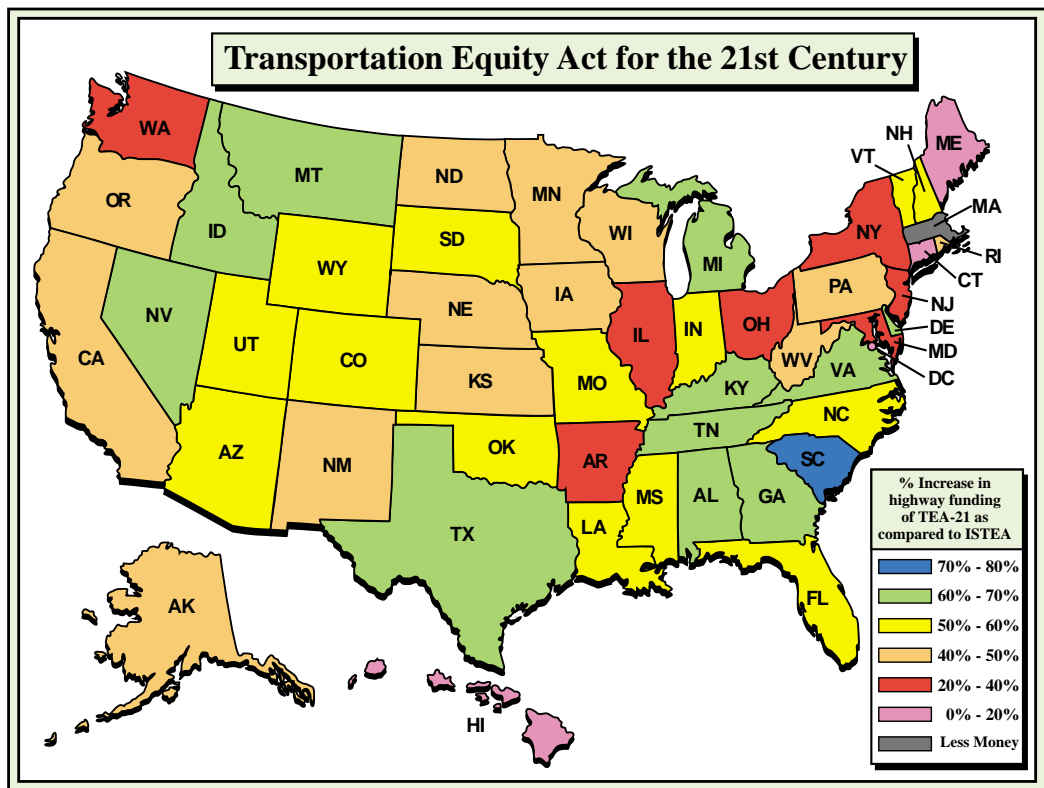
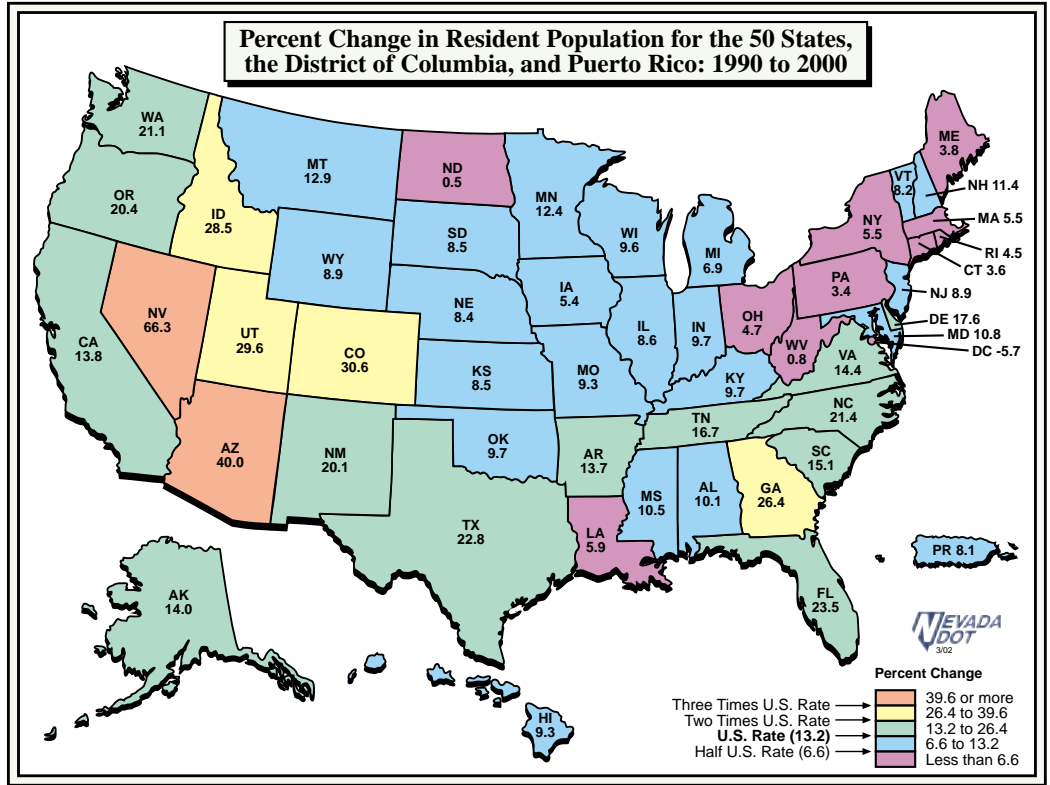
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reduced and a periodic repair schedule based on traffic loading was established to do overlays and other maintenance. Just as it is cheaper to repaint a house before the paint peels, it is cheaper to overlay a pavement before it shows distress.

We could not have achieved these accomplishments without significant increases in federal highway funding. The federal highway program is “reauthorized” approximately every six years. The first six-year program, the Intermodal Transportation Efficiency Act (ISTEA), was passed in 1991 and gave Nevada a boost in federal highway funding. When ISTEA was reauthorized in 1998 as the Transportation Equity Act for the 21st Century (TEA-21), Nevada got more than a 60% increase in federal highway funding. (See map below)

The next six-year reauthorization is due to be passed in 2003 and again Nevada needs a significant increase to keep up with our growth pressures.

However, the battle for additional federal funding may



be a lot tougher this time because of the increasing federal deficit which is often off-set by borrowing from other funds such as the Federal Highway Trust Fund. Instead of spending federal fuel tax collections on highways, they may be locked up in the Trust Fund so the federal deficit appears smaller.

We at NDOT will be spending a great deal of effort in the next year and a half working with the RTCs, our Washington office, consultants, and our congressional delegation to explore every opportunity for increased federal funding for Nevada.

Dynamic Message System Alerts Drivers to Weather, Road Conditions and Detours

Whether it's motorists in northern Nevada being warned of snow over Donner Summit or drivers in southern Nevada advised to make a lane change because of an accident ahead, the public is getting an early warning system to advise

pull off in Reno instead of, say, being stuck at chain controls at Truckee.

"When there is a closure at the California border, you need to get the truckers off the road, and there are few options for them once they get past Reno."

The messages will reinforce broadcasts on the Highway Advisory Radio.

The new signs in northern Nevada are the result of a two-year cooperative effort between Caltrans and NDOT. The \$690,000 cost was split between the two states. NDOT and Caltrans are working on a simple protocol to determine how messages will be prioritized on the signs.

The dynamic message system displays are placed on sign bridges and are 30

activated at the touch of a button.

Larkin-Thomason, a professional engineer, is bullish on what the new signs will accomplish.

"This is a pro-active approach.

When the weather is coming over the pass, we'll be able to warn motorists and reduce the number of vehicles waiting along the highway. It's going to help our maintenance crews who will be able to do their jobs with fewer vehicles stopped at control points."

In Las Vegas, four dynamic message system signs will operate on I-15 south of the spaghetti bowl, three signs are located on I-515, two on US 95 west of the spaghetti bowl, one on I-15 north of the spaghetti bowl, and one on Summerlin Parkway.

As in northern Nevada, which will coordinate with Caltrans, the sign operation in southern Nevada will be a joint agency venture.

Kent Sears, district traffic engineer in Las Vegas, says the operation will be



SMOOTH INSTALLATION—New changeable message signs are going into service in Las Vegas and Reno. The signs will alert motorists to delays, weather conditions and chain or snow tire requirements. Jody A. Lett of the sign's manufacturer, Dambach, Inc., puts one of the big signs through its paces.

them of weather and road conditions.

In the Reno area, three new changeable message signs using fiber optics have been installed westbound on I-80 at Mustang, Mogul and Mountain View. The signs will advise motorists if chain or snow tire controls are in effect, if construction delays are expected, or if there are delays because of accidents.

In Las Vegas, 11 signs will be provided, and nine of them are currently installed. Two more will be erected as part of the Sahara interchange project.

"The signs in northern Nevada will give the traveling public a warning about what's ahead," Engineering Services Manager Tracy Larkin-Thomason said. "It will be part of the overall Intelligent Traffic System we are integrating into the I-80 corridor. The new signs will help motorists and truckers who may want to

feet long and 10 feet high. They are fully enclosed and wide enough to allow a worker access for maintenance. To keep the signs at an optimal temperature and to prevent condensation, heaters and fans will operate automatically as needed.

Information is transmitted to the sign via a phone line hooked up to computers in Reno and Sacramento. The base of the sign pole also has a control panel so that NDOT employees can have access as needed. The control box has 20 pre-programmed messages that can be



UP AND WORKING—Starting with a test message, the changeable sign westbound on I-80 near Mogul will provide valuable information for travelers, alerting them to road and weather conditions ahead.

part of LVACTS, the Las Vegas Area Computer Traffic System. Members include NDOT, Clark County, Las Vegas, North Las Vegas, Henderson, and the

(Continued on next page)

New Signs Will Help Metro Areas in Las Vegas and Reno

(Continued from previous page)

Regional Transportation Commission.

“LVACTS operates the area traffic signals, but at some point the agency will be absorbed by FAST, the Freeway and Arterial Management System,” Sears said. He explained that southern Nevada is working on an integrated traffic system, one that will eventually even suggest alternate routes for drivers on freeways and give directions for a detour on signs mounted near the off ramp.

“We want the new dynamic message system signs to have an impact, so we won’t be using them for public service announcements or to tell motorists there is congestion ahead,” Sears said. “When the signs are dark, that’s good. We’ll only activate the signs when we want motorists to look at them and pay attention.

“We will only use them for situations that require the driver to make a decision, such as choosing another route because of an accident or construction delay, or advising them to make a lane change.”

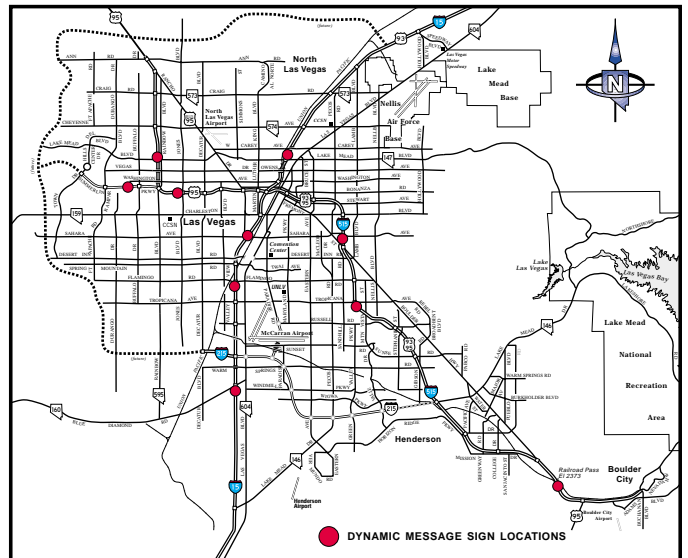
Dynamic Message System Benefits Traveling Public and NDOT Employees

The new Dynamic Message System signs have several advantages:

- **Motorist safety:** Signs are updated by computer link to provide the latest road and weather conditions.
- **Employee safety:** Maintenance is performed inside the enclosed signs, away from traffic.
- **The design ensures that during maintenance nothing will fall to the roadway below.**
- **Traffic flow:** Access to the signs is from a bucket truck along the shoulder of the highway. There will be very little disruption of traffic for maintenance.
- **Energy savings:** Fiber optic illumination is less expensive than incandescent light.



OUT OF THE BOX—A crane lifts the Dambach dynamic message system out of its crate at the NDOT yard in Reno and loads it onto a flatbed truck. Next stop is a sign bridge and installation.



Groundbreaking and Dedication

Nevada Reaches out to Assist I-15 Freeway Project . . .

FONTANA, Calif.-- Nevada's economic lifeline, Interstate 15 from California, will become easier to navigate when 26 miles of new freeway lanes are constructed to remove a four-lane bottleneck between Victorville and Barstow.

Gov. Kenny Guinn of Nevada and Gov. Gray Davis of California launched the project at a ceremony March 21 in Fontana.

The \$160 million widening project will increase lanes from two to three in each direction and improve a vital artery for movement of goods and people among Southern California, Nevada and Arizona. The southbound lane is scheduled to be completed late in 2003 and the northbound lane by late 2004.

Nevada is contributing \$20 million to the project's cost to complement the I-15 widening work now under way between Las Vegas and the California state line. Completion is expected by early next year.

"Fixing the road between Las Vegas and the state line doesn't do us any good if people



THIS WAY—Gov. Gray Davis of California briefs Gov. Kenny Guinn on the improvements to be made on I-15 in California. He's flanked by Caltrans Director Jeff Morales (far left), and NDOT Director Tom Stephens.



get out to Barstow and they're stopped," Gov. Guinn said at the press conference in California. "Even though it's California's road, the traffic on it is really our issue because a lot of it comes from tourists.

"This highway is a very important issue," Gov. Guinn said. "If someone travels to Las Vegas three times a year and he has to sit in eight hours of traffic, he may decide that next year he's only coming twice. That's a drop of 33 percent."

The historic cooperation between the two states will pay off in increased tourist spending, the governor said.



... And New I-15 Lanes at Sahara Interchange, New Durango Overpass, Will Help Traffic Flow

March 18 dawned cool and blustery, but the weather could not dampen the spirits of state and local officials celebrating a

\$33.6 million transformation of Interstate 15 at Sahara Avenue in Las Vegas.

As Gov. Kenny Guinn stated in addressing those assembled, it was difficult to foresee the dramatic growth that would require a complete upgrade of the intersection, including widening northbound I-15 from three to four lanes between Sahara Avenue and Charleston Boulevard.

The project included reconstructing concrete pavement on the freeway and widening Sahara Avenue to 12 lanes. Along with increasing the number of lanes, various other improvements were made, including ramp reconstruction and installation of sound walls, and utility relocation. The interchange project was coordinated with the City of Las Vegas, which completed major drainage improvements within the same area.

Other improvements include a bridge built at Wall Street, an offramp at Charleston Boulevard, and widening the Oakey Boulevard bridge.

Since I-15 was re-profiled, crews demolished and rebuilt the existing bridge over I-15 at Sahara during construction. The challenge throughout the job was to keep traffic moving through one of Nevada's busiest interchanges and on I-15.



CEREMONIAL OPENING—Gov. Kenny Guinn discusses the work involved in creating the new I-15 and Sahara interchange at the dedication ceremony March 18.



MOVING EXPERIENCE—With the lighting of a portable highway sign announcing new lanes are open, state and local dignitaries symbolically moved traffic cones to show the completion of the I-15 work at the Sahara interchange. From left to right are Assemblywoman Vonne Chowning, State Controller Kathy Augustine, Gov. Kenny Guinn, Las Vegas City Council members Michael J. McDonald, Lynette Boggs McDonald, Michael Mack and Assemblywoman Barbara Cegavske.



TAKE A BOW—Members of the NDOT design team, Chris Petersen and Glenn Petrenko, are acknowledged at the Sahara interchange dedication. Their design was used to reconstruct the interchange, build three new bridges and widen I-15 from Sahara Avenue to Charleston Boulevard.

Durango Overpass Eliminates Hazardous Crossing at US 95

READY FOR TRAFFIC—Gov. Kenny Guinn, center, prepares to move a traffic cone signaling the opening of the US 95/Durango overpass on May 13. From left are: Mike Pack, president of Frehner Construction Company; Larry Brown, Las Vegas city councilman and member of Clark County Regional Transportation Commission; Gov. Guinn; Michael Mack, Las Vegas city councilman and member of Clark County RTC; Charlie Kajkowski, deputy director of Las Vegas Public Works Department. The new structure eliminates a hazard for those crossing traffic to get onto the freeway.



Reflector System Installed to Reduce Crashes Between Motor Vehicles and Wild Horses

In an effort to cut down on the often tragic consequences of wildlife coming into contact with motor vehicles, the Nevada Department of Transportation has installed a new reflector system



WILDLIFE PROTECTOR—The “Strieter-Lite” reflecting triangle is designed to warn deer and other wildlife away from the roadway. The Nevada test will be the first to see if the reflector system works on wild horses.

to warn deer and wild horses to stay off the roadway when traffic is present. A three-mile section of US 50 east of Dayton has been outfitted with the “Strieter-Lite” system that is in use in several other states to keep wildlife such as deer and elk away from traffic.

The eight-ounce units of two 2” x 6” red reflectors set at a 54-degree angle, with the base of the triangle forming the side

that is attached to a steel post. The posts themselves can be set up several feet from the shoulder of the road, so they do not become a hazard to motorists or interfere with road maintenance activities. Reflectors are mounted 24” to 30” higher than the crown of the road, and the glow from the reflected light is said to be almost unnoticeable to drivers.

“The reflectors set up along the road create an appearance of an unnatural movement of light which scares deer and other wild animals,” Strieter-Lite owner John Strieter said. “The headlights of vehicles light up the reflectors progressively.”

The warning system is only active when headlights illuminate the reflectors, and does not deter animals from crossing roadways when no traffic is present.

“Animals can see the reflected light up to 600 feet. As cars with headlights approach, the angles of the reflector cause a flickering of intensity,” Strieter said.

“We chose the section of Highway 50 near Dayton because that is a migratory deer route and also has wild horses that stray onto the roadway,” Gail Bellenger, NDOT staff biologist, said.

The reflective devices have been installed in a number of states where wildlife, chiefly deer and elk, pose hazards to motorists. States include Indiana, Minnesota, Illinois, Michigan, Oregon, New York, Maryland, New Jersey, Virginia and Kentucky. Canadian provinces of British Columbia and Alberta also use the devices.

Unlike heavily wooded states where wildlife can bound onto the roadway without warning, Nevada’s wide-open spaces provide good visibility during the day. Deer come into contact with traffic most frequently at dawn and dusk where roads cross established migratory routes.

“Migration routes don’t change but the populations vary,” Bellenger said. “We want to track the effectiveness of the reflector system for three years. By tracking the number of incidents of deer and wild horses being hit by vehicles over several years, as the population varies, we’ll get a good picture of how effective the system is.”

The vendor touted his product as one that will have a dramatic impact on animal-car collisions. “You can expect an 80-90 percent reduction in accidents with wildlife,” Strieter said, citing results from other states.

But this is the first time the reflectors have been tested on a wild horse population. Strieter said the system works for herbivores like deer, elk and moose, and predators like cougars,



INSTALLATION—The Strieter reflectors are mounted on posts away from the shoulder of the road, so the posts themselves are not a hazard to motorists or maintenance. Doing the installation work are highway maintainers Byron Fillmore and Joe Smaltz from crew 272.

Special Section: NDOT and the Environment

(Continued from previous page)

foxes and coyotes, so he hopes wild horses respond in a similar manner.

That would be good news for the local wild horse group, the Wild Horse Preservation League, which encouraged NDOT to take on the experiment to save horses and people. Julie Keller of Dayton met Daniel Nollsch, a supervisor in NDOT's Environmental Services, at a public meeting and talked to him about the warning system. Bellenger followed up with research on the effectiveness in other states, and it was decided to see what the reflectors could do.

Keller, who lives in Mark Twain Estates outside of Dayton, has felt the loss when a beloved horse was killed by a vehicle. A brown mare, featured in a pictorial calendar created by the group, was killed in January 2000. The death occurred just weeks after the mare had given birth to a foal. Luckily, the foal survived even though it was born in the winter instead of the spring, and was deprived of its mother while very young.

"That accident was one of the first things that really sparked me into finding a way to keep the wild horses from getting killed on the highway," Keller said. A friend had received information about the Streiter system years earlier and was able to retrieve it and give it to Keller, who provided it to NDOT.

"After looking into it, we thought the product had some promise, so we decided to try it as a research project," Bellenger said.

Animal and vehicle collisions obviously take their toll, with the likelihood of great harm for wildlife and motorists. There is also a financial cost, with each accident likely to require several thousand dollars for repair.

While it will be possible to determine if the warning system is effective over time, a direct comparison of incidents will not be possible because NDOT collects information for a 9.3 mile section of US 50 and the reflectors will only be installed

Agency Hopes to Reduce Accident Toll With Wildlife

Animals on Roadway Take Toll

There were four fatal accidents involving animals on the roadway in Nevada in 2000, the most recent year figures are available. Three involved cows and one involved a burro. However, there were dozens of additional accidents resulting in injuries to motorists, as shown here:

	Injury Accidents	Property Damage Only
Cows	26	225
Deer	10	290
Dogs	16	49
Horses	7	35
Burros	3	14
Elk	3	7
Total	65	620

for a three-mile stretch.

For a five-year period along the nine-mile length, there were 38 accidents involving animals, including 20 horses, 12 deer and 6 cows.

The highway warning system will cost less than \$20,000, including 700 reflectors at \$18 each, plus stakes to mount them on. NDOT maintenance crews installed the system according to guidelines provided by Strieter.

Bellenger said the warning system, if effective, can be of use in other areas, where migrating wildlife causes a problem with traffic.

"A warning system is preferable to fencing, for a number of reasons," she said. "Fencing is much more expensive, and it interferes with the animals' migration patterns. Channeling wildlife to an underpass can be a problem because it can make them vulnerable to predators."



THE FINER POINTS—Vendor John Strieter discusses installation procedures with NDOT maintenance staff. From left are Walt Clemens, Steve Williams (obscured), Paul Allred, Strieter and Bill Smith.

No Hoops, No Hurdles

Tortoise Training Requires Gentle Touch, Steady hands



"Thanks. That's enough training for now."

The answer to the question, "How do you pick up a desert tortoise?" is: "Very carefully."

Julie Ervin-Holoub, senior biologist for NDOT Environmental Services, gave dozens of NDOT maintenance employees hands-on training on how to handle desert tortoises. The threatened shellbacks sometimes wander onto NDOT construction sites or rights of way, and only those trained in their handling are allowed to move them. NDOT is required to offer the training as part of the Desert Conservation Plan.

The two-hour class was taught during the first two weeks of March at the Desert Tortoise Conservation Center in Las Vegas, owned by the Bureau of Land Management. The center has tortoises of all sizes and ages, and those who took the class learned from Ervin-Holoub that:

"The proper way to handle a tortoise is to pick them up by their sides evenly, with their rear end pointed away from you. If you jostle them, they will urinate. You don't have to worry that their head is closest to you, they don't bite; they're not like snapping turtles.

"Tortoises should only be handled if they are in extreme danger of being injured or killed." Examples given include a tortoise in the road, underneath a vehicle, or in a trench.

Ervin-Holoub said the tortoises must be moved a minimum of 1,000 feet from where you find them, and moved in the same direction as they are going. Place them underneath a bush or in other shade. Another requirement is to dig a depression six or seven inches deep as extra protection from the elements. But the biologist said tortoises like to engineer their own burrows, and usually disdain the ones provided by humans.

If a tortoise is found on federal land, NDOT employees may move them. However, if they are found on private property, the tortoise must be relocated by the Clark County's tortoise pickup service. The tortoises picked up are taken to the BLM Conservation Center and tested for the upper respiratory disease that plagues a large number of the reptiles in southern Nevada. If they are non-carriers, they are taken to the 26,200-acre protected area known as the Large Scale Translocation Site.

Tortoises may be legally adopted in southern Nevada to those with a suitable and safe environment.

The training of NDOT employees to properly handle the reptiles is only one part of a major effort to preserve the tortoise. NDOT, Clark County, the cities of Las Vegas, North Las Vegas,

Henderson, Mesquite and Boulder are part of an agreement that requires the Department of Transportation or its partner agencies to contribute \$550 to \$633 per acre disturbed by a project to the Clark County Conservation Fund. The U.S. Fish and Wildlife Service oversees the fund, and the money goes for conservation measures.

In return, NDOT gets permission to make roadway improvements, including widening of I-15 south of Las Vegas to California.

Desert tortoises are being prevented from crawling onto I-15 and other roadways by a barricade of one inch by two inch mesh fencing that stretches two feet above ground and at least six inches below. The fence allows smaller animals to get through and larger animals, such as bighorn sheep and coyotes, to go over.



HANDLE WITH CARE—NDOT senior biologist Julie Ervin-Holoub taught highway maintainers in the Las Vegas area how to handle desert tortoises when the reptiles have to be moved for their safety. Classes were held at the Desert Tortoise Conservation Center.

Agency Hanging Out Vacancy Signs for Waterfowl

Highway construction projects sometimes—unavoidably—affect wetlands and wildlife. If that happens, NDOT and other affected agencies do their best to make up for the impact on the environment.

One of the department's biggest mitigation projects was the creation of approximately 300 acres of wetlands on the southern end of Washoe Lake. The wetland helps to compensate for NDOT projects in the Truckee Meadows and the Washoe, Eagle and Carson valleys, so there is no net loss of wildlife or habitat.

Man-made pools have been formed by levees running east-west and north-south. The water levels of the various impoundments can be controlled in spite of drought, thanks to a groundwater well, a surface water pump and other sources, including McEwen Creek.

To make the habitat as beneficial as possible, three nesting islands have been created, and native water-loving plants like hardstem bullrush, cattails and pondweed have been planted.

Though the first phase of the wetland area was only created in 1989, the number of waterfowl attracted to the area include mallards, coots, herons and Canada geese. Raptors include red tail and rough tail hawks.

One of the most inspiring sights at Washoe Lake and the new wetland is the American white pelicans who fly in from Anaho Island at Pyramid Lake to feed on catfish and carp.

Though the wetland development, costing about \$3 million, is essentially complete, the department is still improving the area for waterfowl. Dan Rice, senior development technician of NDOT Environmental Services, is encouraging the population of waterfowl in the wetlands area by installing nesting boxes. The wooden boxes are said to attract ducks such as the common goldeneye, hooded merganser and wood

duck. To attract mallards, a different approach, a mesh basket, is used.

So far, seven nesting boxes and one basket have been placed in the wetland area. Five more baskets are planned.

Rice builds the nesting boxes with the safety of the fowl in mind. The boxes are mounted on poles, which predators can't climb; and the fronts of the boxes are removable, so nesting material can be taken out at the end of the season. Removing nesting material cuts down on avian diseases.

Rice's attention to detail even includes slight notches on the inside of the nesting boxes to give chicks a purchase to clamber out. And because waterfowl like to have vegetation around their nests,

willows are planted at the base of the nesting boxes.

"I'd also like to build a platform for a nesting pair of great blue herons," Rice said. "They can land on something flat, while raptors prefer branches they can wrap their talons around."

A viewing area, complete with telescopes, is open to the public at the south end of the wetland. Even commuters on busy US 395 between Reno and Carson City, which borders the wetland, enjoy a glimpse of a pelican, hawk or duck. With the wetlands becoming more established, and Rice hanging out more vacancy signs for waterfowl, the views should get better and better.



ENCOURAGING WORK—Nesting boxes designed to foil predators are part of the habitat improvement in wetlands south of Washoe Lake. The boxes and baskets encourage breeding in the wetlands. Dan Rice, senior development technician for NDOT, places one of the nesting boxes he built.

NDOT's Tucked-Away Testing Lab Serves Western States and Canada

Tucked away in a doublewide garage bay in a corner of the NDOT District II equipment yard in Reno, is a lab that is a mecca for transportation departments and manufacturers of equipment throughout

western Canada. In March, a private contractor who provides testing services for Alberta brought in that province's FWD for calibration. The devices are mounted on a trailer and towed by a pickup truck.



TESTING—Chris Joncas runs the testing lab in Reno, which serves state departments of transportation throughout the west. Here he watches the impact registered on the computer from the falling weight on the deflectometer behind him.

the western United States and Canada.

Though the location is nondescript, what the lab does is important: calibrating falling weight deflectometers, or FWDs, an important research tool in determining the soundness of pavement.

“You can’t tell the soundness of the pavement just by looking at it,” Patty Polish, supervisor of roadbed testing,” said. “You need to do an analysis to determine pavement’s true condition. With a deflectometer, you can help determine the thickness of the overlay required.”

For the past 12 years, Nevada has been only one of four states in the country that calibrate the FWDs. With the nearest calibration stations in Texas and Minnesota, the Reno lab is visited by every western state and two provinces in

a platform attached to the cylinder. The known weight falling from a known height onto a known radius produces a known amount of force, measured in pounds per square foot.

Information is transmitted to a computer which graphs how the force of the weight impacts the pavement.

“We can simulate the weight of a tire on an axle bearing the legal weight of 22,000 lbs., which

is 11,000 lbs. on one wheel,” Polish says. The reaction to the pavement is measured by other components of the FWDs, seven or nine sensors, called geophones.

The sensors, laid out in a straight line for a few feet in front of the load cell, measure the “give,” or deflection in the roadway. The more deflection, the closer the pavement is to failure, and the greater the need for maintenance or replacement. The results can give an idea of how the asphalt base and subgrade of a roadway will perform over time.

“Through its lifetime, the pavement will take a certain number of loads,” Polish said. “You’ll see a smaller amount of deflection in a new roadway than you will when it’s 15 years old.”

FWDs are used in conjunction with other tools, such as taking sample cores from pavement to see how it is holding up.

Liz Radomski of Grand Prairie, Alberta, drove 1,800 miles to Reno to have that province’s FWD calibrated. In addition to travel time, it generally takes two or three days to calibrate the devices.

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SHOWING RESULTS—Peter Schmalzer of the Law Gibb Group (left) reviews procedures and results from the deflectometer test with Chris Joncas. The group is hired by the Federal Highway Administration to monitor one of the deflectometer tests annually to make sure NDOT is using proper procedures.

Calibration Equipment Reveals the Strength of Pavement Below Surface

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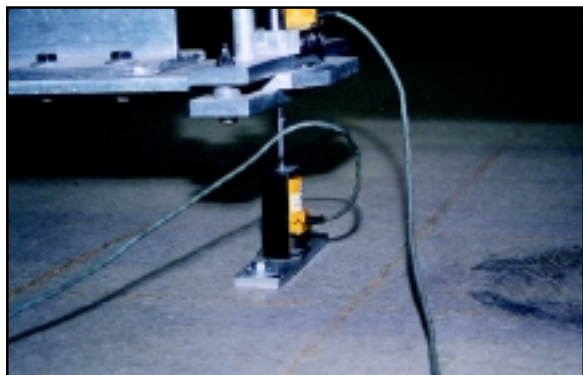
The FWDs are allowed to sit for one day to become acclimated, and testing begins the next day.

Chris Joncas, who runs the



BOUNCE!—The impact of several thousand foot pounds of force hitting a load cell registers plainly on the computer monitoring the deflectometer test.

deflection testing lab, conducted the test. Weights on the FWD were dropped from ever increasing heights, simulating vehicle loads ranging from the weight of pickup trucks to oversize loads allowed only by special permit. The Alberta FWD performed admirably, with variation of



SENSOR TEST—Measuring devices are laid out in a line from the deflectometer's point of impact. NDOT's lab tests these devices as well, measuring them against a precision instrument. The sensor test is done on a heavily reinforced concrete slab insulated by two inches of rubber.

only 100 lbs. or so at more than seven tons. The tests were repeated and the Alberta FWD was able to duplicate the earlier results. The FWDs have to perform to a tolerance of three one-thousandths of error.

After the FWDs weight tolerances were checked, the next round of testing was for the sensors. The FWD and sensors were placed on a special concrete pad insulated on the sides and bottom by two inches of rubber to prevent interference from outside sources.

The sensors of the unit being tested are compared with a

precision instrument owned by NDOT.

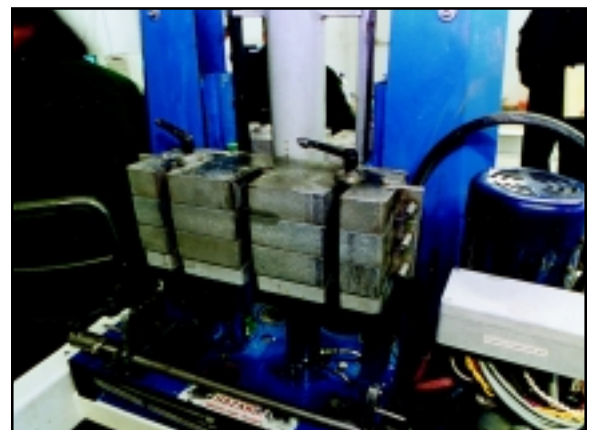
The U.S. and Canadian governments require deflection devices to be tested annually, and Joncas performs two dozen or so FWD calibration tests every year. "It's not just the western

states and Canada," he said. "A manufacturer of deflectometers will send the units to us for testing before they are shipped. We may certify a deflectometer used in Maine or Florida. We've also tested deflectometers for the military which may use the FWDs for roads and runways"

But who checks Nevada, to make sure it is certifying the equipment of other states correctly? The Federal Highway Administration hires a contractor who watches a

deflectometer test to make sure Nevada's technicians follow proper procedures. To test its equipment, Nevada sends its load cell to Ithaca, NY, once a year for testing by Cornell University.

The testing of FWDs is part of the requirements of SHARP, or the Strategic Highway Research Program. As a federal program, testing FWDs ensures that the same type of equipment and procedures will produce the same data if used on the same section of roadway.



THE LOAD—Heavy metal plates are raised by hydraulics to various heights and allowed to fall and strike a platform. The resulting impact is measured by computers to determine the soundness of pavement.



From Paint to Landscaping, Sound Walls to Steel Girders

Research & Development Dept. Previews Products of the Future

From traffic paint that is four times brighter than what's currently used, to sound walls made out of a plastic type material that absorbs sound as well as directs it upward, the Research and Development Division of NDOT previews and evaluates materials that may someday be used on Nevada roads.

"We look at a broad range of issues, from vegetation to be used for landscaping to improvements in pavement and roadway construction," Research Division Chief Alan Hilton said. Research and Development projects include improved pavement, landscaping, erosion control, steel girders for bridges, seismic retrofit of structures and traffic management software.

Sound walls, as an example, are currently made of masonry or concrete, materials that are good at deflecting decibels, but not absorbing them. One recent vendor who visited the department hopes to qualify for purchase translucent polycarbonate material that can be used as a substitute for masonry or concrete where weight is a concern.

Hilton relies on Tie He for coordinating research and Masha Wilson for coordinating product evaluation. They in turn rely on representatives from the NDOT divisions that know most about the product or process to be evaluated. There is a separate committee structure for research and product evaluation. Committees consist of NDOT division heads and top management.

Most research is conducted by universities or consultants with expertise in a specialized field, although some research is conducted by NDOT staff. He, for instance, manages an in-house research project to evaluate filler asphalt crack fillers.

Vendors are eager to sell products to an agency as large as NDOT. Wilson said her job as product evaluation coordinator attracts a dozen phone calls a week and

hundreds of pieces of mail each year from promoters touting their product.

Investigating each product is impossible, and NDOT management and the Research Department set goals on which product or type of product should be evaluated. The 2002 work program for Research, Development and Technology Transfer has its priorities and budget set for the year. Projects include an advanced rotary snowplow, soil mixing for highways, a curved girder steel bridge and an erosion control field lab. Other projects include retrofit of the downtown viaduct in Las Vegas and researching solutions to problems with scour around bridges along the Truckee River.

Another project is studying durable pavement marking materials to see if there is a better alternative to the epoxy-based traffic paint currently in use. The Product Evaluation Committee approved testing urethane and polyurethane-based marking materials in a one-year evaluation on US 395 south of Carson City. Research and Traffic monitors six sections of pavement for the paint's performance using state-of-the-art equipment.

"We found the paint we are testing is four times as bright as the average epoxy paint," Wilson said. "However, the cost is so much greater that we may not be able to justify it as an alternative to standard traffic paint except in areas with high traffic volumes or for specific applications."

As a result of this research, products that perform well will be added to lists of approved products for

pavement markings. A second result will be a matrix that allows users to choose the optimal durable-pavement marking for each situation.

Research has several resources to pursue its aims. The Federal Highway Administration administers research projects that pool the resources of several state DOT offices. For example, NDOT is working with Caltrans as the lead agency in a pooled-fund study on snowplows. Because operators have to contend with whiteout or near whiteout conditions in winter, the feasibility of a guidance system using a magnetic strip down the center of the travel lane is being researched. This multi million-dollar research project also includes the evaluation of crash avoidance technology similar to radar.



PRECISION LOOK—This machine measures the reflectivity of the pavement marking right after it is applied, and a later test will see how well the material performs over time.

R&D Takes on Broad Range of Issues and Applications



APPLICATION—A type of polyurea marking material is applied to the roadway south of Carson City. NDOT Research and Development will monitor how the pavement marking performs under actual traffic conditions.

Changes Announced for Bus Services in Reno, Winnemucca, Pahrump, Fernley

Winnemucca has a new bus service. The Humboldt Area Rural Transit (HART) demand response (Dial-a-Ride) service started earlier this year. The handicapped-accessible service runs Monday through Friday from 7 a.m. to 7 p.m. and covers a 25-mile radius around Winnemucca. Residents can call 24 hours in advance to be picked up at their homes and taken to medical or dental appointments, work, shopping, school, personal errands, recreational activities, etc. The HART system is funded through the Federal Transit Administration Job Access and Section 5311 - public transportation programs.

Bus service between Fernley and Reno on I-80, and a separate program in Pahrump, may become a reality this summer.

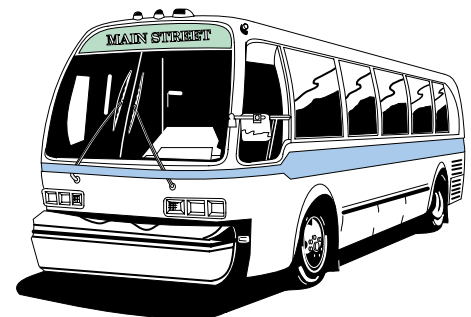
In Pahrump, a “pulse” system is being developed where buses are routed to pick up people who cannot walk to a bus stop. In a “pulse” system, buses are assigned to a certain section of the community and take passengers to a central location for transfer.

A request for proposal for service along I-80 between Fernley and Reno is also in the development stage and service may start as early as June. The industrial area of Fernley now has several large employers including Trex Company, Quebecor World Inc. and Amazon.com.

Another Reno area service is being discontinued for lack of riders. PRIDE service from Sparks to the Tahoe-Reno Industrial Park in Storey County has ended. The Regional Transportation Commission is offering to work with

various entities to create vanpool services or assist with ridesharing programs in place of the PRIDE route.

NDOT is also working with Storey County to develop demand response (Dial-a-Ride) service from the Lockwood/Rainbow Bend area to Reno in place of the discontinued PRIDE route.



Freeway Service Patrol Helped Motorists More Than 30,000 Times



Annual numbers are in for the Freeway Service Patrol in Las Vegas in 2001, and they are impressive. The daytime patrols on US 95, I-15, and I-515 covered 240,804 miles and patrol workers provided assistance 31,030 times.

Most calls were for a vehicle broken down or out of gas: 27,352 times. Assistance was also rendered for accidents and to remove debris in the roadway.

Western Nevada Agencies Asked for Input



GETTING COMMENT—Each year, NDOT’s District II holds a roundtable discussion on upcoming projects, and seeks comments from local government leaders. This year’s meeting, the district’s fourth, was held at the Delta Saloon in Virginia City. From left to right are: Phil Kangesberg, NDOT student intern; Debra Starnes, District Traffic; Denise Inda, District Traffic; Marty Fink, District Utilities; and Scott Nebesky, Reno-Sparks Indian Colony.



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