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GOING UNDERGROUND

Community leaders propose putting Caltrain tracks deep underground. Is the idea visionary — or just plain crazy?

story by **Jocelyn Dong**
photos by **Marjan Sadoughi**

The disruption happens more than 55 times a day along Alma Street: Bells clang, crossing-guard arms lower, and people and cars grind to a halt as hundreds of tons of locomotive steel approach.

The train thunders by, horn wailing, leaving wind and dust in its wake. Then life returns to normal.

One day, all that could be history if an idea being floated by some Palo Alto leaders becomes reality.

Call it visionary or call it far-fetched: They think the railroad could be put underground — in tunnels 50 feet below the surface.

If that were to happen, drivers might experience Alma as a grand boulevard in the European tradition rather than a commute corridor flanked on one side by railroad tracks and bushes.

Where tracks now lie, bicyclists would glide on paths along a greenbelt, while office workers would look out their windows as commuters drive by.

And in the tunnels underground, trains would silently whisk their passengers to destinations along the Peninsula.

No more street-traffic delays due to the rail system. No more train-on-car accidents. No more fatalities.

To some, it may sound like a pipe dream. Even the main proponents — City Councilman John Barton, former Mayor Bern Beecham, architect Tony Carrasco and Interim Deputy City Manager Steve Emslie — joke about whether they are crazy to even suggest such a thing.

But underlying their wisecracks lies a common vision, one they say would have the power to unify — even heal — a city that's been divided by the railroad for more than a century.

Until they're proven wrong, they're willing to explore the idea with anyone who will listen.

And now, they say, is the time to do it, thanks to the rising possibility that a high-speed train route between Los Angeles and San Francisco could be added to the Peninsula corridor. On the November ballot, state Proposition 1A asks voters to approve the sale of bonds worth \$9.95 billion to provide initial funding of high-speed rail.

Due to the state-budget impasse, its place on the ballot was not ensured until Aug. 26, when Gov. Arnold Schwarzenegger signed AB 3034, giving it the green light.

If the proposition passes, plans for running high-speed rail through the Peninsula would pick up steam, with construction on parts of the line following after about two years of planning, according to Mehdi Morshed, executive director of the California High-Speed Rail Authority.

A fully functional system would enable passengers to travel from San Francisco to Los Angeles in under three hours, operating at speeds of up to 220 mph, the Authority predicts.

It could be the opportunity of a lifetime for Palo Alto, the community leaders say. With high-speed rail would come funding, and with funding — the possibility to creatively, and radically, alter Palo Alto's cityscape.

Building two tunnels (under Alma, they say) and placing the rail system there would free up acres of valuable land along the current 4.25-mile right of way.

The area now occupied by the University Avenue train station, for example, could become a dynamic gateway to downtown. The group envisions an oval "village green" surrounded by a hotel, community/arts center, visitors' center, retail, office space and more.

Below ground, the train station and an intermodal transit hub would allow travelers to switch their mode of transportation quickly and easily.

Along the former rail route, lining Alma, the group pictures a 25-foot-wide park with grass, trees and pedestrian and bicy-

cle paths. The strip park would run from Palo Alto's southern border all the way to its northern one, totaling about 8 acres, they estimate.

Adjacent to the greenbelt, the rest of the land could be developed in stretches: as high-density townhomes, apartment buildings, shops and office space, they said.

What excites them the most is the idea of removing what they call the railroad "barrier" between the east and west sides of the city, which now limits cross-town traffic to four intersections — Charleston Road, Meadow Drive, Churchill Avenue and Alma — and four over/underpasses at San Antonio, Oregon Expressway, Embarcadero Road and University. (The city also has two bicycle/pedestrian tunnels, at California and Homer avenues.)

"It will heal Palo Alto and connect so many neighborhoods to other uses," Carrasco said. He co-chaired the 1990s Dream Team Citizens Advisory Committee, which explored the possibility of transforming the University Avenue train station area into a major entryway into the community.

"We talk about 'walkable' and 'bikeable,'" Carrasco said of Palo Alto's long-term goals, which he said the underground plan would advance. "This does so much to be able to get across from business areas to residential areas," he said.

The California Avenue shopping district, for example, could be quickly accessed by cars without them looping around via Oregon Expressway's underpasses.

Barton, who is also an architect, said the benefits could be important.

"Imagine if Colorado Avenue could come through. Suddenly the new police station [planned for Park Boulevard] is that much closer to a whole section of Palo Alto," he said.

Removing the tracks "would take four quadrants of Palo Alto and make it two," he added.

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Underground train

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The idea could also raise a lot of money, the group contends. By selling or leasing "air rights" — rights to build on the land without acquiring the land itself — the Peninsula Corridor Joint Powers Board in theory might garner enough funding to pay for the added cost of undergrounding. The board owns the right of way and manages Caltrans' 570-acre parcel.

"If you go along with our estimates, we get to about a half-billion dollars of land value, which hopefully is the marginal difference in cost between what high-speed rail would pay for above-grade [rail] and the cost of undergrounding," Carrasco said.

To get those estimates, the team determined what kinds of buildings the line from moderate-income apartments to live/work units to offices and retail shops.

All told, they calculated more than 660 homes and 814,000 square feet of office and retail space could be built, placing the land at a value of \$464 million.

Some of what we know is there's a reasonable value in the land in air rights, and it's going to cost a lot to tunneling," Beecham said.



At the University Avenue train station, former Palo Alto Mayor Bern Beecham (left) talks with architect Tony Carrasco (right), as Councilwoman John Barton looks on project details.

"If somebody's going to come out anyway and lay out the tracks [for high-speed rail] and put a lot of investment in ... then you can say, 'We've got underground rather than do this.'"

"We don't know if it's going to work ... But [the estimates] are adequate to show there's meat on the bones," Beecham said. "It is feasible."

The idea of burying the railroad and selling air rights may seem unusual, but it's hardly inventing the wheel.

In fact, it was key to the monumental transformation of Grand Central Terminal in New York in the early 1900s.

At that time, city and state officials prohibited steam engines in Manhattan, following a 1902 crash that killed 15 people, according to the PHS document, "Grand Central," which Barton cited as one inspiration for the Palo Alto idea.

Central Railroad's chief engineer decided to switch to electrified engines. Not only that, he determined they should run underground and the land above them could be sold to developers.

He called the concept "taking wealth from the air," and it was the first time the notion of "air rights" had been proposed, the document states. The idea helped the railroad company successfully finance the project.

Today, Grand Central spans 48 acres and contains 103 retail shops, occupying 130,000 square feet.

Closer to home, the San Francisco Transbay Joint Powers Authority is attempting a similar project, which will replace the city's current Transbay Terminal along Mission Street with a new station, extend the Caltrain line 3,400 homes, 60,000 square feet of shops and 1.2 million square feet of other commercial space.

Sale of that land is expected to bring in more than \$200 million, according to the Transbay Joint Powers Authority.

The idea of a city advocating for undergrounding rather than accepting grants from the federal government is not new.

In the early 1960s, BART planned to build a line on elevated tracks through the heart of Berkeley's downtown.

"BART was supposed to run down Shattuck, and folks in Berkeley said, 'Hell, no.' And they won," Barton said.

The city eventually used a sales tax to finance the undergrounding. The result was a high-speed rail line — also have plenty of predecessors, the group members said.

Civil engineers note that tunneling is constantly improving.

"We have tunnels all over the world that have been around for 150 years," said the Rail Authority's Morshead, a civil engineer who has worked on state policies and laws.

Transportation projects for 34 years and worked on state policies and laws.

"They're not any more dangerous than above-grade or at-grade [tracks]. It's a matter of engineering."

Eleven countries already have high-speed rail systems, according to the Rail Authority.

The U.S. rail network, the Shinkansen, uses tunnels that stretch for 16 miles or more. The system has run for nearly 45 years and carried some 7 billion passengers. It has survived numerous earthquakes, derailing only once, and hasn't had a single fatality due to rail collisions or natural disasters, engineers note.

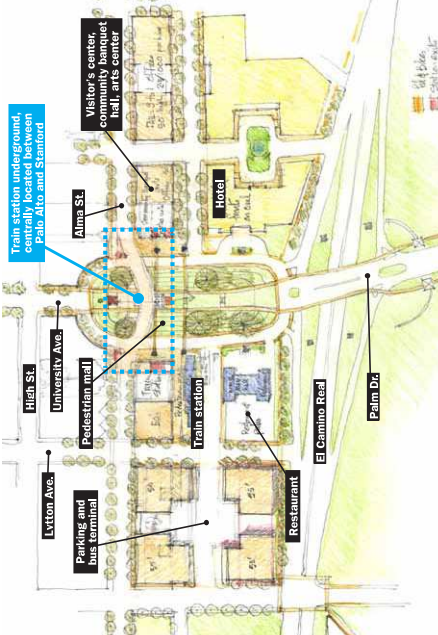
The United States also has a high-speed line, Amtrak's Acela Express, which runs through the Northeast Corridor, averaging 150 mph and reaching as slowly, up to 150 mph, than foreign high-speed trains, which can top 220 mph.

There are, naturally, many "ifs," on which the undergrounding idea is based:

- If the tunneling is done in a way that doesn't require massive pressure.
- If high-speed rail comes to the Peninsula as currently proposed.
- If all the agencies involved — Caltrans, the Rail Authority, Union

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Proposed underground Palo Alto train station



Above, a sketch of how the visitor's center, hotel, arts center and Palo Alto station would be centrally located between Palo Alto and Stanford.

Challenges ahead

Legal action could derail high-speed train plans, or at least keep them tied up in the courts for years.

On the other hand, the idea of tunneling could also sway some high-speed rail opponents.

"It's pretty hypothetical, but certainly, putting all the tracks underground and using public right-of-way would be a serious look," Menlo Park Councilwoman Kelly Ferguson, a civil engineer, said of the concept.

"It would have to be dramatically dense development on the land to pay for the project, though, she said."

But there would need to be a strict trust agreement if the Rail Authority were to agree to the undergrounding then revert to above-ground plans if funding proved insufficient, she said.

Diesel in tunnels

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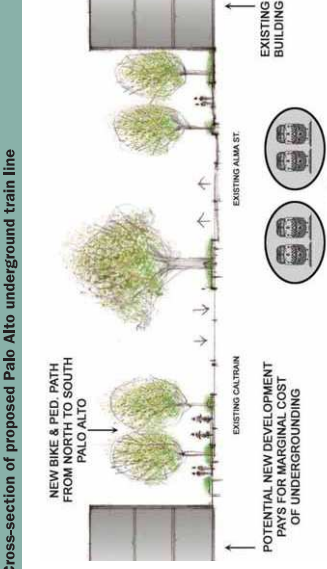
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Cross-section of proposed Palo Alto underground train line



The architect's sketch of how the city would look if tracks were put underground.

trenching, civil engineers say.

Historically, tunneling has been more costly than other methods, says Peter Romero, principal for Jacobs Associates in San Francisco, a civil-engineering consulting firm.

But the costs of buying property and loss of business during construction of trenches and other qualitative downsides have started to add up.

"We're looking for trenching to be 10 to 15 percent more expensive than above-ground or cut-and-cover, but in the long term there's the biggest benefit," he said.

Costs aside, however, trenching is possible, even at key junctions such as San Francisco Creek, Romero said. There, the trench would likely go under the road.

Trenches can also be stacked on top of one another and can go down to depths of 80 or 90 feet, he said.

Keller believes trenches could work, even if the construction phase could be difficult.

"It's unifying ... and in terms of the benefit of not having to get rid of homes for the right of way, you're doing something nice for the city," he said.

Like other community leaders, Keller views air rights as key to funding the undergrounding. He is likewise concerned about the possible increased congestion to traffic to and from — and faster — trains run through Palo Alto.

"As Caltrans increases the number of trains going by ... it decreases the time for the cross traffic going along El Camino. It's especially problematic, going to Palo Alto, because you're stuck in traffic for 10 to 15 minutes — or at least it feels like 10 minutes."

A project to electrify the Caltrans system aims to double the number of passenger trains per hour, from six to 12, according to Bob Doty, Caltrans' director of rail.

There would be challenges to trenching, of course. Keller acknowledged the Oregon Expressway underpass would have to be reconstructed, and underground public utilities would need to be re-routed.

Also, either Alma or the current rail road right of way would have to be reconstructed, and undergrounding would have to be re-routed.

"That conflict between train and auto traffic flow — yet still be operational, Keller acknowledged.

"The everyday life of residents — is one reason some cities and agencies are now preferring tunneling to

Tunnel or trench?

There's more than one way to put a railroad underground

Not everyone who wants the railroad to go underground envisions a tunnel.

Using a technique known as "cut and cover" and starting at surface level, a trench is dug, tracks laid inside, other equipment installed, and then the trench is covered. Keller believes the trenches could either be dug above or below the current rail road right of way.

At several cities boy into the idea, the trench could start as far south as Mary Avenue in Sunnyvale, he said.

"One advantage is you don't have to put in the grade separations," said Keller, who has enjoyed high-speed rail projects in other parts of the world.

"I don't see why you would want to do that. The cost is prohibitive," Keller said. "Think of the cost of tunneling for BART. This is worse than BART in terms of tunneling costs."



Palo Alto planning commissioner Arthur Keller, at the Churchill Avenue train crossing, is concerned about longer waiting times at intersections as more trains run through the city.

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Steve Lewis is President of Lewis & Mathews Investment Management in Menlo Park. He is a college professor, investment counselor, Value Line award winner, financial author and has appeared on national radio and television. He is a past officer of the S.C. International Association of Financial planners and served on the National Academy Advisory Board. He has written for Money magazine and Dow Jones's Barron's.



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Commuters wait as a southbound train pulls into the University Avenue station.

Underground train

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Pacific (which operates freight trains), other local transit agencies, the City of Palo Alto and potentially neighboring cities — buy into the plan. (See sidebar story on challenges.)

But there’s no merit in waiting for absolute certainty before floating the undergrounding notion, Beecham said.

“It’s a long-term concept, and you’re in it for the long term,” he said. “There’s no value in us starting and stopping in a jerky-jerky fashion, saying, ‘Oops, this week, bad news in Sacramento.’”

Even given the uncertainty, the group members are galvanized by at least two factors: timing and an alternative they fear could be worse for Palo Alto than ground-level tracks — elevated ones.

They believe they face a short time-span within which to act. Even as Rail Authority planning gathers momentum, with a potential completion date in 2030, Caltrain is proceeding with its proposal to convert its system from diesel engines to electric. Its goal is to finish the electrification of the system by 2014, according to Caltrain.

“We have a short window to jump at this, short meaning five to six years, before Caltrain and the High-Speed Rail Authority start talking to each other on what their plan would look like,” Carrasco said.

“Once their plans get too concrete, our chance is gone,” Beecham said.

What the group finds even more motivating is the possibility that high-speed rail might run through Palo Alto not at ground level but elevated.

The Rail Authority anticipates it would add two tracks to the Peninsula right of way, which currently has two, Morshed said. It also recommends elevating those tracks.

If the Palo Alto leaders feel current ground-level train tracks are problematic, elevated berms (or “grade separations”) would be even worse, they said.

“Berms really don’t work in these urban situations. With four tracks, it’s not a berm; it’s a structure,” Carrasco said, calling concrete berms “ugly as sin.”

Some cities along the Peninsula, such as San Carlos, already have grade-separated tracks, directing cars under the tracks either at street level or via an underpass. But the ones up north have businesses adjacent, Carrasco said. Palo Alto’s right of way abuts numerous homes.

Those homes closest to the tracks might even be in danger of disappearing, according to Barton. If it’s determined that a four-track berm could require a wider strip than currently exists on the right of way, the state could use eminent domain to purchase the properties.

“I couldn’t imagine a four-track with a berm wouldn’t require buying up all the properties on the train-track side of Park Boulevard,” Barton said.

For its part, the High-Speed Rail Authority believes

that grade separations would be an improvement over ground-level crossings. Elevated crossings would eliminate the noise from train horns and warning bells because the railroad would no longer intersect with traffic, the Authority’s May 2008 program environmental study states.

The visual barrier would be no greater than currently exists, according to the document. Rather than being deleterious, grade separations “would have a beneficial effect on community cohesion by improving circulation between neighborhood areas.”

To be sure, the undergrounding idea, with all of its ramifications, has a long distance to travel before it becomes a reality, if it ever does.

Other agencies will play a key role, the men said. So far, the groups are open to discussing the concept.

From where he sits in Sacramento, Morshed views all ideas as possible — so long as they make sense financially and practically.

“Whatever we do there, life has to go on at that site,” Morshed said, referring to the construction phase. “People have to do their business; cars have to cross. We need to be considering all those things.”

Tunneling, he said, “might be a very viable solution” — if the numbers support it.

At this stage, the Authority is about to hire an engineering firm to work on project plans. It expects to hold community meetings in the future to gain input on its proposals, Morshed said.

Caltrain’s Rail Transportation Director Bob Doty has already met with the Palo Alto group, noting that they mostly wanted to get a reality check on the idea.

He said he pointed out factors they should be considering, including the fact that the railroad will still need to be operating during the construction of any new rail line.

“My business has always been about creating the expectations. You have to be realistic about what it’s going to take,” he said. “It’s not a trivial undertaking.”

Besides the need for the railroad to stay operational, tunneling requires a span in which to get underground — possibly a mile on either side of the fully submerged tunnel, Doty said.

But just because there are complexities, “it doesn’t mean you should give up,” he said. “You want new ideas. ... We offered to talk with them in the future as it starts to focus in.”

The Palo Alto leaders acknowledged they could be working on the railroad plan for years, until it either is proven impossible or it comes to pass.

In the meantime, they said, they are undaunted by the complexity. The outcome would be worth it to them.

“This is a dream, of course, but wouldn’t it be great to say, ‘And we got rid of the train. And we got sales tax [from new stores]. And we got a better boulevard. And we solved some housing issues?’” Barton asked rhetorically.

“And we made it a better city,” Carrasco added. “It may not happen in my lifetime, but that’s OK.” ■

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