UPDATE FROM THE ITE TRANSIT AND TRAFFIC IMPACT STUDY COMMITTEE

How Should Public Transit Be Evaluated for a Regional Attractor?

The Case Study of the San Francisco 49ers Football Stadium

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Engineers are sometimes asked to develop solutions to problems that perhaps should not be solved. Imagine a bridge over the Grand Canyon; while it would be very challenging and even immensely rewarding technically to achieve such a feat, most everyone would agree that it is not a good idea for many reasons. While this example may be extreme, it illustrates the dilemma that we transportation engineers often face: we are given a land use plan or development site and asked to essentially, "make it work."

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Thus charged, engineers often end up tinkering with the transportation network to ameliorate a land use plan that fundamentally cannot be served by that network. The negative externalities caused by poor land use-transportation integration include automobile dependency and its numerous environmental impacts; recurrent congestion; suppression of transit, bicycle, and walk trips; increased obesity levels; and increased household transportation costs.

The premise of this paper is that we as a profession do not have adequate procedures to analyze whether or not a major land use change is appropriate in the context of the transportation system. This stems from past over-reliance on auto level of service (LOS) as the only measure of effectiveness.[1,2] This single-minded focus on automobiles (even in congested cities) caused us to ignore, nay abdicate, our responsibility for how to consider all other modes. Furthermore, the lack of the concept, let alone practice, of providing multiple layers of public transit modes within a single metropolitan area has essentially made transportation engineers codependents and facilitators of the bad land use decisions caused by economic pressures. See Figure 1.

The standard practice for evaluating the appropriateness of land use decisions with respect to the transportation system is the transportation section of Environmental Impact Reports/Statements (EIR/EIS). Though project specific, the recommendations contained in an EIR/EIS influence a region's form and development for decades. What does our profession need to improve the scope and quality of our analysis and recommendations and as a result do our job better?

This paper does not purport to delineate all of the answers; rather it aims to raise the issue by presenting a case study of the transportation assessment of a recent major land use decision in the San Francisco Bay Area in California, USA. At a minimum, we hope to illustrate by way of a counter-example that:

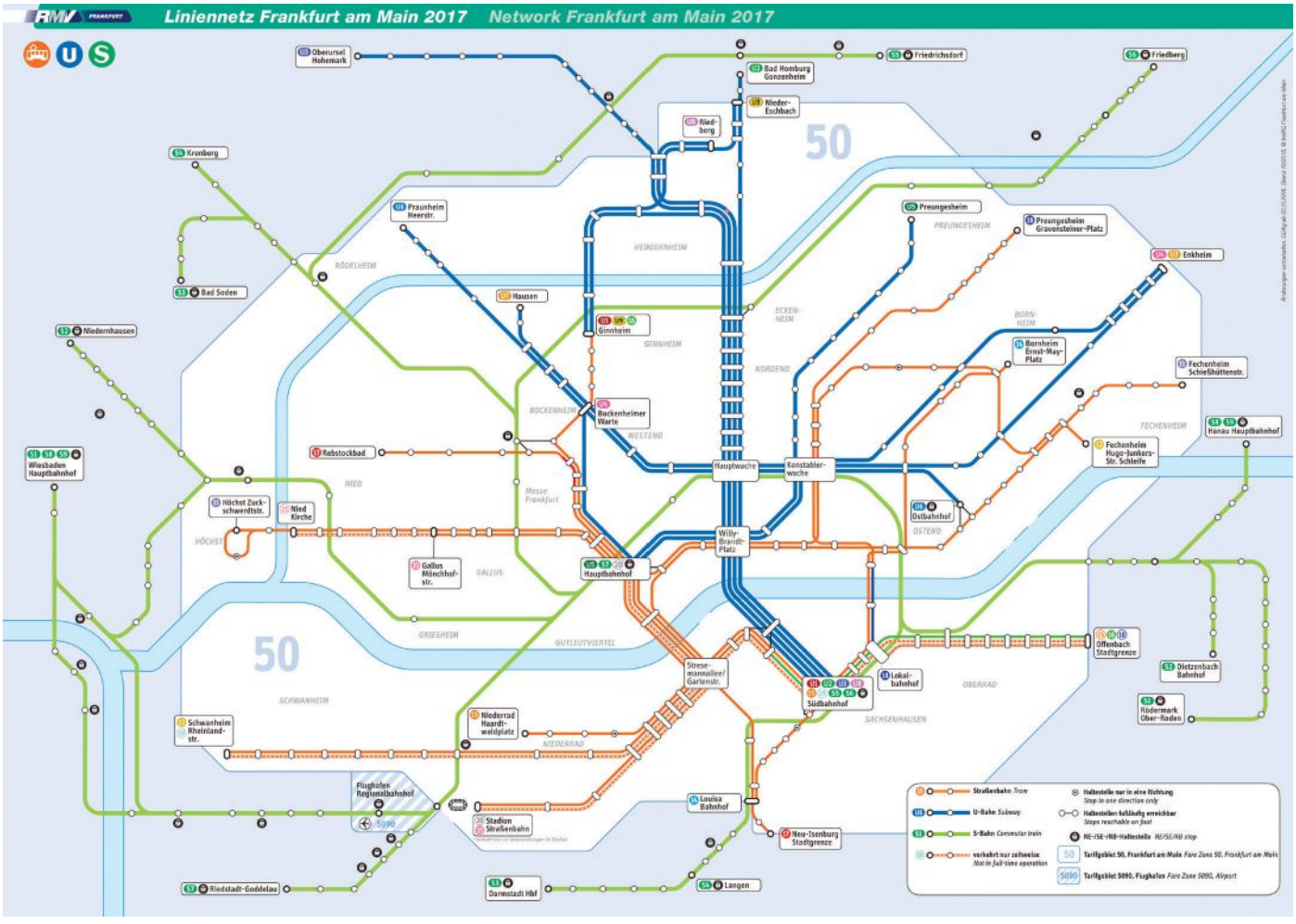

Figure 1. Even moderately-sized cities in Germany have several complementary rail modes of transit. This figure illustrates the rail modes available in Frankfurt, population 700,000: tram/light rail (orange), subway (blue), suburban commuter rail (green), and regional intercity rail (not depicted).

a) addressing transit directly in a traffic impact study (TIS) would result in better land use decisions and better urban design as a whole; and
b) that we need better tools and procedures to adequately conduct such analyses.

Case Study Description

The San Francisco 49ers football stadium was relocated from Candlestick Park in San Francisco, CA, USA to another county 40 miles away in the City of Santa Clara, CA. It opened in 2014. The 70,000–80,000 seat stadium is clearly a multicounty and regional trip attractor; fans come from throughout northern California.

The county and regional rail transit options near the site are depicted in Figure 2. The project site is conveniently served by Santa Clara County light rail (VTA LRT). However, VTA LRT trains have a 3-car maximum, with about 300 passengers per train. While this can serve some of the demand (estimated at 4,500 fans, thus 15 full train sets), the LRT network only serves roughly 25 percent of Santa Clara County. Furthermore, Santa Clara County is a small portion of the regional draw of the 49ers stadium. Yet VTA LRT was assumed to be able to handle the bulk of the project's public transportation needs since, as described below, the regional rail services have shortcomings.

There are three multi-county heavy rail providers in Santa Clara County, all of which the EIR cited as serving the site: ACE, connecting San Jose to San Joaquin County through southern Alameda County; the Capitol Corridor, an inter-regional Amtrak train that runs between Sacramento and San Jose through Contra Costa and Alameda Counties; and Caltrain commuter rail that connects San Francisco, San Mateo, and Santa Clara Counties. Only two of these three have stations that are close enough (¼ mile) to the stadium so that patrons can easily walk: ACE and Capitol Corridor. However, both of these rail providers run infrequently, even during normal peak hours: ACE only runs weekdays and only has six trains: three in the morning in the peak direction and the reverse in the afternoon. Capitol Corridor has headways of 90 minutes or more. Furthermore, Capitol Corridor leases the track from the Union Pacific Railroad (UPRR), therefore enhancing its service is extremely complicated due to the needs of freight. Thus, both heavy rail services would need to provide special trains outside normal service operation in order to serve the project.

The third heavy rail service, Caltrain, in theory has the greatest potential to serve the site, since: a) its train capacity is approximately 800 seated passengers compared to LRT at 300; b) it has much more frequent headways; and c) has service until midnight and on weekends. Moreover, it serves San Francisco and the Peninsula, the historic core of the 49ers fan base. However it is located two miles from the site and therefore is dependent on connecting service. Since provision of an estimated 23 shuttle buses

City of Santa Clara, CA, USA

Figure 2. Map of the county and regional rail transit options near Levi's Stadium in Santa Clara, CA, USA, home of the San Francisco 49ers football team.

was deemed " impractical," the best available option for station access would be three coordinated 3-car train sets of VTA LRT, limiting access by Caltrain because of LRT capacity constraints.

The stadium markets itself as being Leadership in Energy and Environmental Design (LEED)-certified. Given that 38 percent of greenhouse gas (GHG) emissions in California are due to transportation, shouldn't *realistic* public transit access be part of a LEED score? How can our profession help LEED certification include this aspect of sustainability?

Transportation Analysis in the EIR

Let's take a look at what the transportation section of the EIR did (and did not) address.[3]

Setting

The setting section described existing transit services available in the vicinity of the project site along with their service frequencies, headways, operating hours, and the nearest transit access points.

The transportation setting section did not include:

- An assessment of the "Quality" of the transit service under existing and future conditions for any of the public transit modes: e.g., local bus, light rail, and the regional rail services.
- A travel time comparison of transit versus vehicle modes.
- Most importantly, there was no direct comparison of the project alternative sites of their ability to accommodate the expected project trips by the existing public transit service.

Regarding the first point, it must be noted that a *Transit Quality of Service* (QOS) manual exists, but was not used.[4] To be fair, in ITE Transit and Traffic Impact Study Committee's review of 64 TIS guidelines in the United States and Canada, we found that transit QOS is rarely assessed by any methodology. Why not? There appears to be a disconnect between the transit community and the TIS community that must be bridged. If the QOS manual had been used, it would have shown that the existing regional train service fell into the "worst" category. While the third edition dispensed with the LOS rating system contained in the second edition, if LOS were calculated, the transit LOS that ACE and Amtrak provided to the site in terms of headways and service hours was in fact LOS E and F.[5] Regardless of whether it is given a letter grade (per the 2nd edition) or a verbal description (per the 3rd edition), wouldn't such an analysis have been useful information for the public and decision makers in evaluating a $1.3 billion project attracting patrons from a 60+ mile radius?

Impacts

The transportation section did not address transit let alone identify any impacts to transit. The EIR merely stated that there should be a "Transportation Management Plan" (TMP) to analyze transit service. Thus the TMP contained the transit analysis, not the EIR. Curiously, the TMP's findings were not cited as impacts in the draft EIR, nor were any recommendations cited as mitigation measures.

Instead, all of the transportation impacts and project mitigation measures identified in the EIR were traffic-related, i.e., intersection and freeway segment operations. Furthermore, since the traffic impacts would occur only for a few days per year, no mitigation measures were planned.

The lack of an assessment in the EIR of the ability of the existing transit network to serve a major traffic generator raises the question: Where in the chain of events did this failure occur?

Mitigation/Recommendations

Since the EIR did not identify any transit-related impacts, the EIR included no discussion of mitigation measures to accommodate transit demand whatsoever. Neither did it cite transit improvements as a strategy to help mitigate vehicular congestion by providing alternatives to driving. This despite a statement in the Final EIR (FEIR) that "a critical element in providing transit service to the stadium site will be the LRT operations."

Only under "Response to Comments" did the FEIR state the following:

- "The City is prepared to work with VTA in evaluating the demand on the light rail and bus systems and in preparing an analysis of operating conditions needed to support transit ridership assumed in the EIR including an assessment of design and infrastructure needs of the system at a level necessary to support stadium operations to the satisfaction of VTA and the City."
- "The details of how the complex transportation system for the stadium will be managed will be described in a Transportation Management and Operations Plan (TMOP)…. The TMOP will be a mitigation measure required as a condition of approval of the project."

Note that these are not EIR mitigation measures and thus are not the financial responsibility of the project sponsor. Moreover, only the preparation of the TMOP is required, not implementation of its findings, i.e., the necessary physical and operational changes to transit that would be necessary to handle project impacts. The FEIR assumed that implementation of the to-be-developed TMOP would accommodate additional transit demand during event days, and that the additional transit capital and operating costs necessary to accommodate demand would occur without any funding mechanism identified.

In short, the FEIR was approved without knowing whether nor how the project's transit demand could be adequately met. Is this the best we can do as a profession? Shouldn't the EIR have stated upfront that any transit service enhancements are not possible without funding for new train sets and operations? Shouldn't the EIR scope include addressing financial responsibility for additional capital and operating costs as mitigation of project impacts?

TMP/TMOP

The draft TMP included what many might assume should be in the transportation section of the EIR: an estimation of the expected transit demand and recommendations for how to improve transit service to accommodate project-generated transit trips. Its mission was to develop a plan to "to make it work" and included recommendations for special game-day trains by ACE and Amtrak, and a fleet of VTA shuttle busses to serve areas not served by rail transit.

Of all the transit improvements identified in these two documents, the project was only required to contribute to VTA the cost of "a second platform at the Great America station, so (VTA) could better handle the loads. They also built a combination of permanent and temporary fencing along the rail ROW in front of the stadium to prevent pedestrian intrusions."[6]

Professional transportation planners need a mechanism to evaluate land use projects of various scales, (e.g. local, citywide, or regional) to ensure that its accessibility by public transit is of an appropriate scale and capacity.

Neither the EIR, the TMP, or the TMOP included any of the following:

- Improvements to transit capacity, frequency or travel times as mitigation for project traffic or transit impacts.
- Identification of the operational and capital costs of VTA for both their LRT service and to provide a fleet of game-day shuttle buses.
- Identification of the operational and capital costs for ACE and Capitol Corridor to serve the site outside their normal hours of operation.
- Identification of financial responsibility for providing these additional transit services which implement the recommendations of the TMOP.

Epilogue

Two years after its opening, how well this site is served by public transit can now be reviewed, as well as the cost to do so. After a game, up to 10,000 people have to wait in line for a train that holds 300. Despite ridership being roughly double that which was predicted, VTA costs greatly exceed revenue; even local newspapers have been covering the public subsidy to serve the stadium:

- Both the *San Jose Mercury* and *Silicon Valley Business Journal* (SVBJ) reported that VTA's extra costs include running 80 LRT cars on weekends instead of the usual 20, 200 extra staff to sell tickets and monitor the crowds, 40 contract security workers, and special game-day shuttle busses.[7,8]
- VTA lost $30,000 per event ($30 per passenger) just providing shuttles in 2014/15.[7]
- SVBJ reported that while the question of total public cost is still unclear, it's very clear that, despite the stadium having hundreds of millions of dollars in revenue, VTA loses money serving the stadium. Of the $4 million cost to provide stadium service the first year, only $600,000 was recovered in fares.[8]
- The *San Francisco Chronicle* reported that VTA lost $500,000 a year just running LRT stadium service due to extra trains, extra drivers, and overtime pay.[9]

For calendar year 2016, VTA estimated that fares covered approximately one-third of the costs incurred to serve the site; thus its deficit was $1.5 million to serve the 23 events at the stadium.[10]

Potential Parallel: Parking Revenue and Public Safety

It should be noted that the stadium receives roughly $12–$20 million a year in parking revenue. The agreement with the stadium owners calls for "the 49ers to reimburse the City of Santa Clara for extra police and fire protection and pass along a share of parking revenue and tickets."[11] The team paid the city $2.4 million in FY 2014/15 for the costs to provide additional police/security guards on game days. Apparently police departments are not expected to just "absorb the cost." Should there also be a project contribution for needed game-day public transit? "We're sending people to the Niners games with taxpayer money," [VTA spokesperson] Hendler-Ross said. "And the 49ers have not stepped up to help us recover the costs. We think they could be doing something more to offset this service."[9] However, since the City of Santa Clara does not operate public transit service, they have little incentive to require developers to help pay for it.

Conclusion

The analysis contained in the TMP and TMOP attempted to make the best of a bad land use decision. But at what point could/should it have been predicted that it just was not a good site from the perspective of public transit? As engineers are trained to take a given problem and devise the best solution, this is in fact what the TMP/TMOP for the 49ers stadium did. Yet this approach ignores the transportation–land use connection. It also ignores the social/political question of who is financially responsible for bad land use decisions. In this case, the problem that they attempted to solve could have been resolved by matching the regional-scale land use project to transportation infrastructure of a regional scale. However, the lack of professional guidance on both: a) how to consider transit service in a TIS, and b) what constitutes appropriate transit service for various sizes and scales of land uses, has led to inappropriately-located sites with respect to the transportation infrastructure, particularly transit.

ITE Transit and Traffic Impact Study Committee Recommendations

To improve future analyses, our recommendations fall into two distinct areas of responsibility:

1. **Regional decision makers:** Regional policies are needed which identify appropriate locations for large traffic generators that draw from throughout and beyond the region. Clearly this should be done in conjunction with the long-range transit plan for the region as a whole. This would ensure that projects such as stadiums, airports, and medical campuses choose locations that are served by appropriately-scaled mass transit (e.g. commuter and regional rail). At present, there is no professional guidance to help identify optimal locations for regional generators from the standpoint of transit accessibility; instead we attempt to make the best of suboptimal locations. Another constraint is that, in California at least, long-range transit planning—and funding—is done county-by-county, despite the fact that crossing county borders is a daily fact of life for many.
2. **Profession-wide:** Professional transportation planners need a mechanism to evaluate land use projects of various scales, (e.g., local, citywide, or regional) to ensure that its accessibility by public transit is of an appropriate scale and capacity. Quality of service standards for various modes of transit in various land use contexts would greatly assist in this regard.

At the very least, we as a profession should develop a consensus of what (and how) transportation studies of regional traffic generators such as 80,000-seat sports stadia (stadiums) should address. **itej**

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