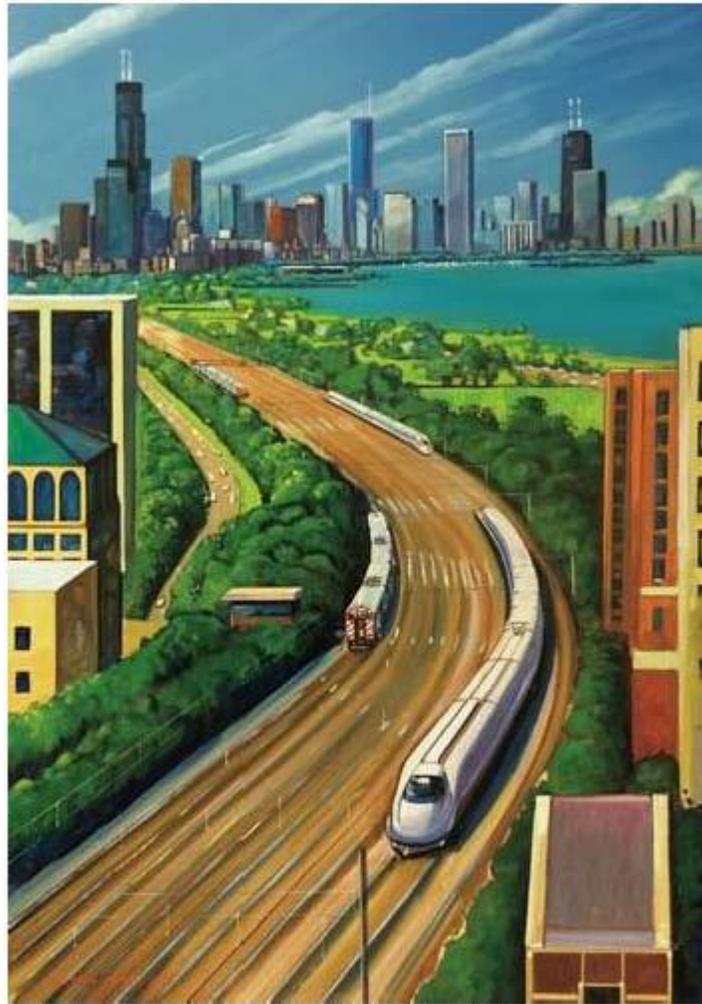


Transpiration and Sustainability Analysis for CMAP

Technical Analysis and Proposal

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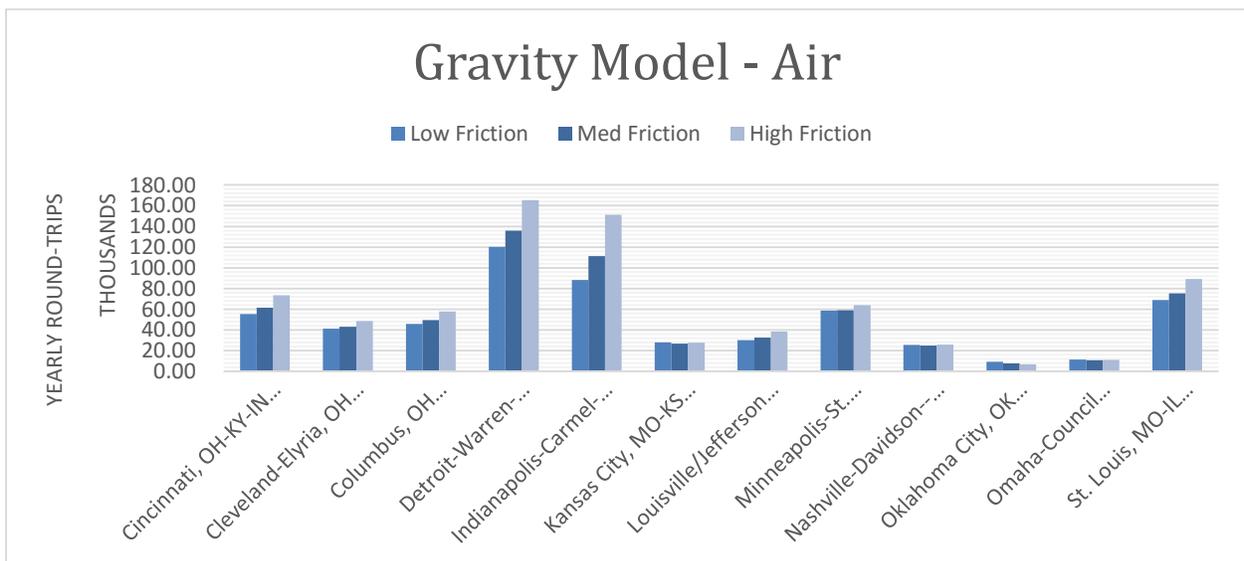
Midwest High Speed Rail Association

A) Gravity Model Analysis

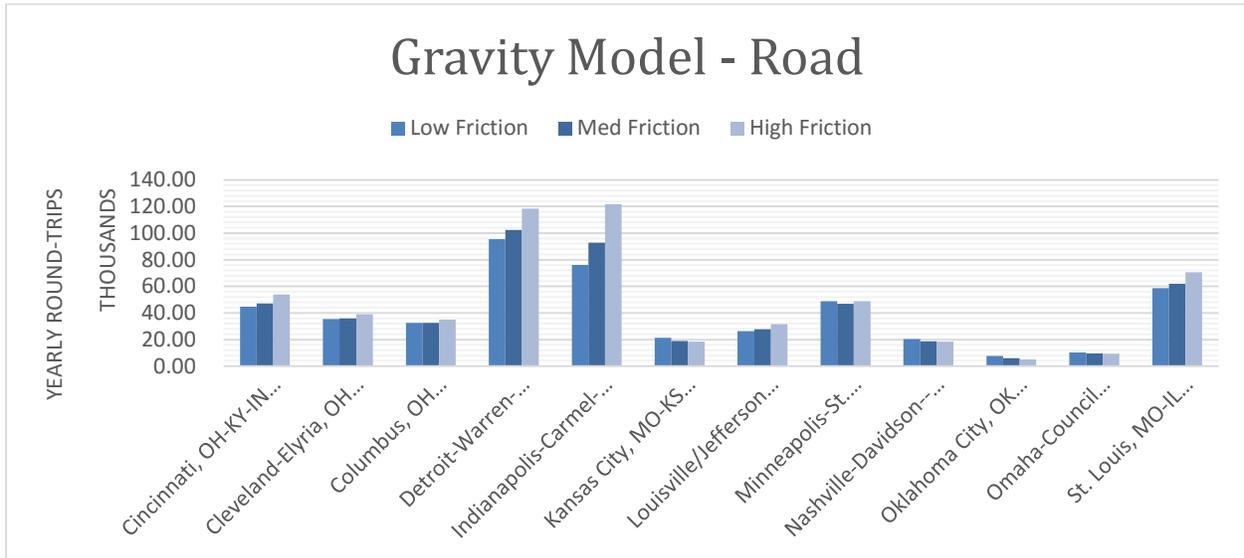
For years, we have neglected our regional rail infrastructure. This has led to a decrease in regional rail efficiency and diluted investment capital, which could provide funding for economic development projects along major rail corridors throughout the greater Midwest region. With the recent allocation of federal funds that will enable the improvement of our aging rail infrastructure, we can now devote planning efforts into identifying the Midwestern nodes that will yield the maximum efficiency for improving transit to Chicago. By using analogy of Newton's Law of Gravitation, we can provide context in population distribution between various nodes within a network, with variables for attractions based on the distance of a node from the origin and ease of friction to transverse through the network.

In order to provide potential recommendations, a simple gravity model analysis was used in order to determine yearly estimated travel patterns from all major Midwestern metropolitan areas; these areas were chosen based on areas that had a population of greater than one million. The city of Chicago was used as the origin node, while the other metropolitan areas were used as the transit nodes. In assessing the Midwest, three friction coefficients were used to account for various changes within the network including changes to toll costs, oil prices, and ease of travel. These were a low friction (1.3), medium friction (1.6), and a high friction (1.9). When applied to two primary modes of travel, we can assess which major metropolitan area will benefit the most from improving the rail corridor from Chicago to that particular metropolitan region.

In examining the gravitational output of the air corridor, utilizing the mid-friction scores, Detroit, Indianapolis, and St. Louis had the highest transit scores. This also is not unexpected as these cities are generally viewed by the public as some of the largest and most economically stable within the region. However, the result of Detroit was interesting, as the model does not take into account additional economic variables and only reflects travel patterns based on population, additional variables would need to be included to gain a more complete picture of transit patterns between these major cities. These additional variables were added in the secondary phase of an evaluation matrix analysis which is discussed in the second section.



The road corridor reflected much of the same findings as the air corridor indicating that although traveling by road, there is not much difference based on population and distance sensitivity. Overall, the change in distance was relatively minor, additional variables specific to road infrastructure should be added to the model to accommodate issues relating to traffic and construction, which can greatly change the friction coefficient being used.



Overall, this model provides a simple examination of cities that are worth a greater examination for federal funding to improve the rail system. However, each corridor should include additional variables, which will help define and improve model performance in its predictive abilities for improving long-term travel corridors. These additional variables are addressed in the next section.

B) Evaluation Matrix

After assessing the overall gravitational transit patterns of the region, an evaluation matrix was created to include additional units of measurement that will influence or greatly affect any rail infrastructure improvements. The additional measures include the cost of air travel to Chicago O'Hare, violent crimes reported in the transit city, and projected future growth based on average net-growth mean deviation. These measures were chosen based on the hypothesis that these measures are consideration that the general populous takes into account when choosing modes of travel.

There was a significant inverse correlation between the cost of air travel and the results of the gravity model based on different frictions. This result illustrated that the higher the cost of travel resulted in lower scores at the higher friction rate. This can be interpreted that when high cost is present, the higher friction score should be used. This was a natural assumption of the data analyzed, however confirmed by the resulting correlation coefficient. This can also be noted in the matrix by examining both the rankings of Cincinnati and Minneapolis.

Utilizing these measures greatly affected the base overall rank of these cities based on the original model, where cities such as Cincinnati, which were previously ranked in the middle of the grouping, are now re-ranked at the top of the matrix. Cities such as Detroit, which had previously been highly ranked, now dropped significantly within the rankings, specifically the safety score greatly affected travel to Detroit. Additionally, it can be noted that several of these major metropolitan areas can be combined on the same high-speed rail corridor (overall rankings may change slightly based on the recalculation) such including Indianapolis as an intermediate stop on the Cincinnati- Chicago corridor.

C) Regional Station Development Initiative

Based on the prior high-speed rail infrastructure regional analysis, a new regional transit hub would be necessary to consolidate regional transit corridors and facilitate an improved optimization to move passengers from throughout the region into the heart of Chicago. This new transit hub would be the ideal for linking multiple transit corridors throughout the central Midwest as it is a natural transit choke-point location offering easy access not only to multiple rail lines but also centralizing any travel utilizing the interstate highway system. This location, near Ewing Ave and 99th St, offers the optimal location as it has the potential for connecting three major rail corridors, Cincinnati, Cleveland, and Detroit, in addition to being located just off the Chicago Skyway, which will allow major passenger bus companies a hub, connecting regional passengers through multiple modes of transit.

In addition to connecting major modes of transit in central location just outside Chicago, it also offers a prime location for tourist development. This location has a reasonable walk score averaging within the mid-70s. With the creation of the transit hub, new economic development is likely to occur improving not only the green-space of Calumet Park but also spur development of local stores and restaurants. Residential rent is low compared to the average Chicago cost with similar locational amenities. Additionally, the economic boom that will follow the creation of this transit hub will create new jobs within this currently depressed region both at the hub itself and within the community catering to regional passenger and the newly created workforce.

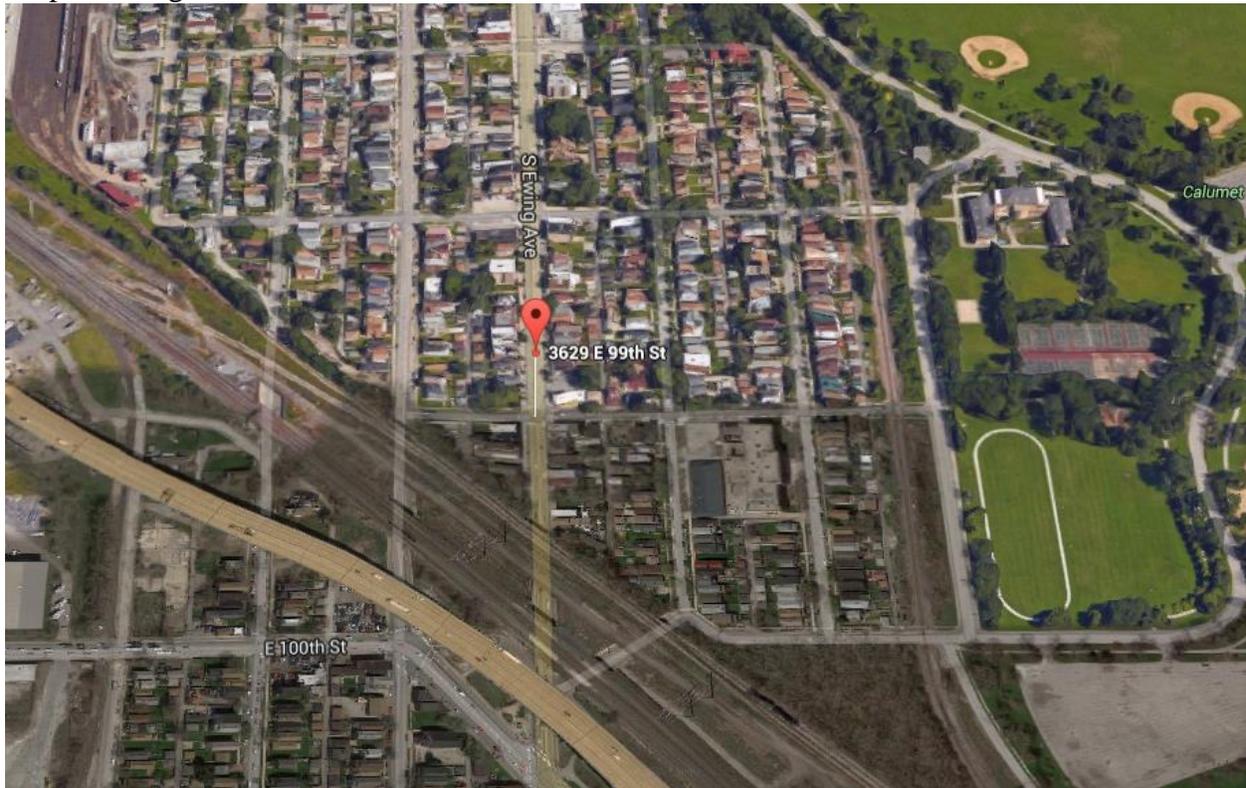
One key aspect that is likely to hamper or prevent the construction of this new transit hub would be which organization would be responsible for its operation. Although this location is within Chicago city limits, the authority would ideally belong to the RTA. Currently, there are three service boards under the RTA, (CTA, Metra, Pace) a new service board would need to be created in order to ensure optimal function. This board should be comprised of one-third elected officials from Chicago, one-third elected officials from the suburbs, and one-third appointment by CMAP. This transit hub is unique in that emphasis on its operation needs to be placed on the greater Midwestern region rather than the greater Chicago region as traditional transit planning has done. Although this newly created service board would only be responsible for the operation of this one transit hub, there is a potential for future projects to link major markets that originate outside of Illinois to Chicago; these would fall under this service board.

Finally, monies allocated to this, and any greater Illinois regional transit hub, should include monies earmarked to spur local development. This is an important aspect for the successful development of these regional stations. Although natural development patterns

suggest that these area will natural improve and grow around these hubs over time, by offering earmarked grant monies as part of the overall project, the area will immediately improve its attractiveness for regional passengers. Additionally, by earmarking these monies, it leverages greater buy-in from the local populous who may be opposed to the creation of a high-volume regional transit hub in their neighborhood by offering them a monetary incentive.

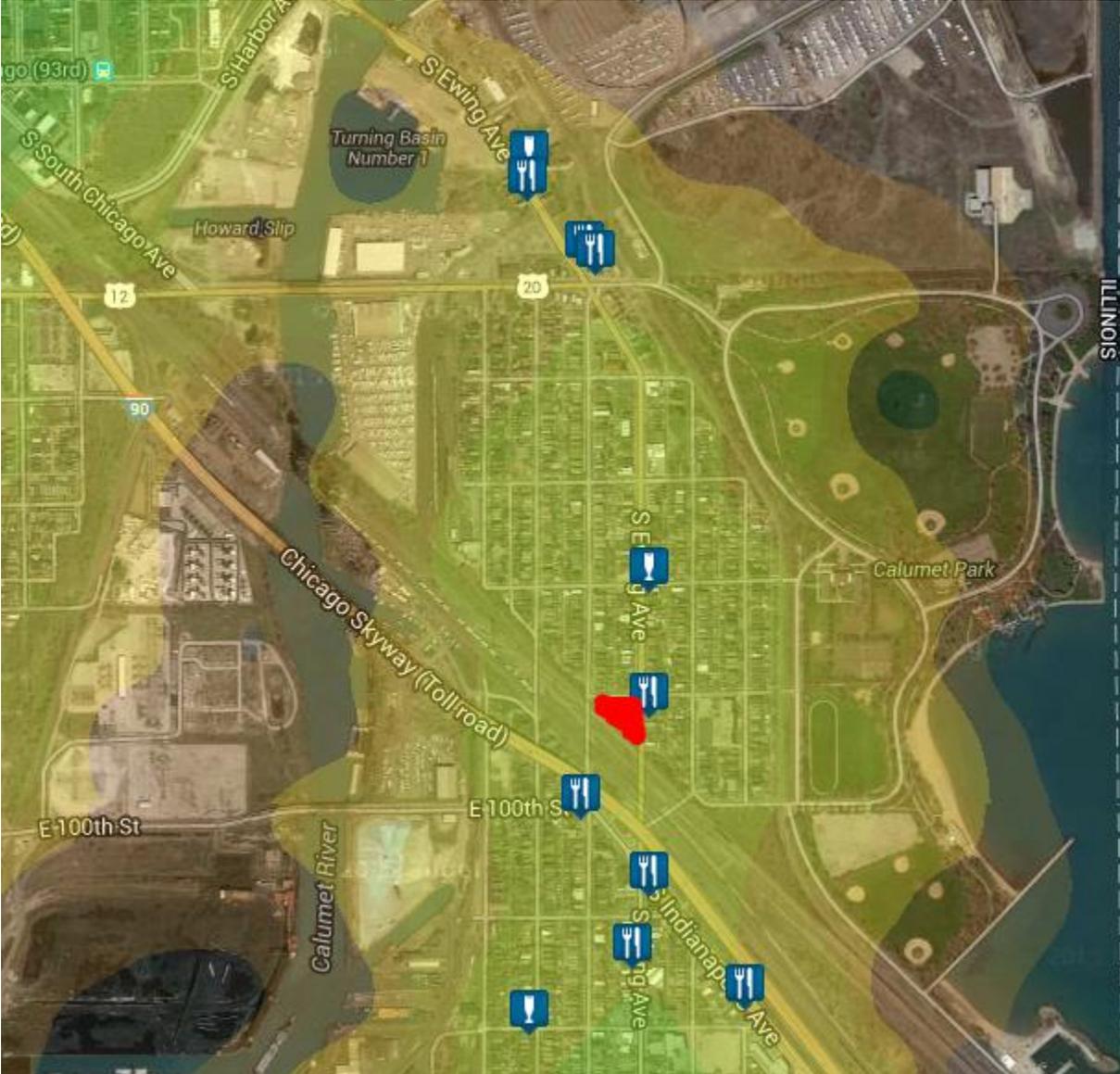
Appendix

Proposed Hegewich Station



This location offers the optimal location to serve as a regional station within Chicago servicing lines from Cleveland and Cincinnati. These cities were ranked 6 and 1 respectively in the overall high speed rail evaluation matrix. With this location's close proximity to the Chicago Skyway and community green-spaces such as Calumet Park, this would be the optimal location on the South Shore to invest in a new regional station.

Average Walk Score Density for proposed Transit Hub



The proposed location, highlighted by the red triangle, illustrates the walk score density of the area (the darker the green, the higher the score) in addition to showing current amenities within the area. Through the creation of the regional hub, greater economic development will be spurred increasing the local business.

Evaluation Matrix								
City	Violent Crimes Reported **	Cost of Air to O'Hare *	Future Growth Potential	Low Friction	Med Friction	High Friction	Criteria Ave	Overall Rank
Cincinnati, OH-KY-IN Metro Area	2	1	7	5	4	4	3.833333	1
Cleveland-Elyria, OH Metro Area	7	6	3	7	7	7	6.166667	6
Columbus, OH Metro Area	5	8	5	6	6	6	6	5
Detroit-Warren-Dearborn, MI Metro Area	12	9	9	1	1	1	5.5	4
Indianapolis-Carmel-Anderson, IN Metro Area	9	11.5	4	2	2	2	5.083333	3
Kansas City, MO-KS Metro Area	1	7	8	9	9	9	7.166667	7.5
Louisville/Jefferson County, KY-IN Metro Area	3	11.5	6	8	8	8	7.416667	9
Minneapolis-St. Paul-Bloomington, MN-WI Metro Area	9	10	10	4	5	5	7.166667	7.5
Nashville-Davidson--Murfreesboro--Franklin, TN Metro Area	11	3	1	10	10	10	7.5	10
Oklahoma City, OK Metro Area	6	2	2	12	12	12	7.666667	11
Omaha-Council Bluffs, NE-IA Metro Area	9	4	11	11	11	11	9.5	12
St. Louis, MO-IL Metro Area	4	5	12	3	3	3	5	2