ELECTRODYNAMIC SUSPENSION

THE FUTURE OF RAIL TRAVEL IN THE UNITED STATES

SITE PLAN

5905 FRIARS RD, SAN DIEGO, CA 92110

1" = 100'-0"

SITE PLAN KEY

1. SITE ENTRY
2. PARKING
3. DRAINAGE POND
4. MAGLEV TRAIN STATION
5. SITE PATHS
6. SITE EXIT
7. MAGLEV TRACKS

PROJECT BRIEF

This thesis project revolves around the concept of creating a new rail system using magnetic levitation (maglev) technologies. The proposed rail line travels across the United States from San Diego to New York City connecting twelve other major cities along the way. In order to simplify designs, a template station was designed in order so that future stations along the route can pull elements of the original during their construction to drive down costs. The particular station that is featured in this thesis project is located in San Diego, the western-most city of the maglev train line. From this origin point, the train will extend eastward across the nation eventually connecting the two coasts together.

DESIGN STATEMENT

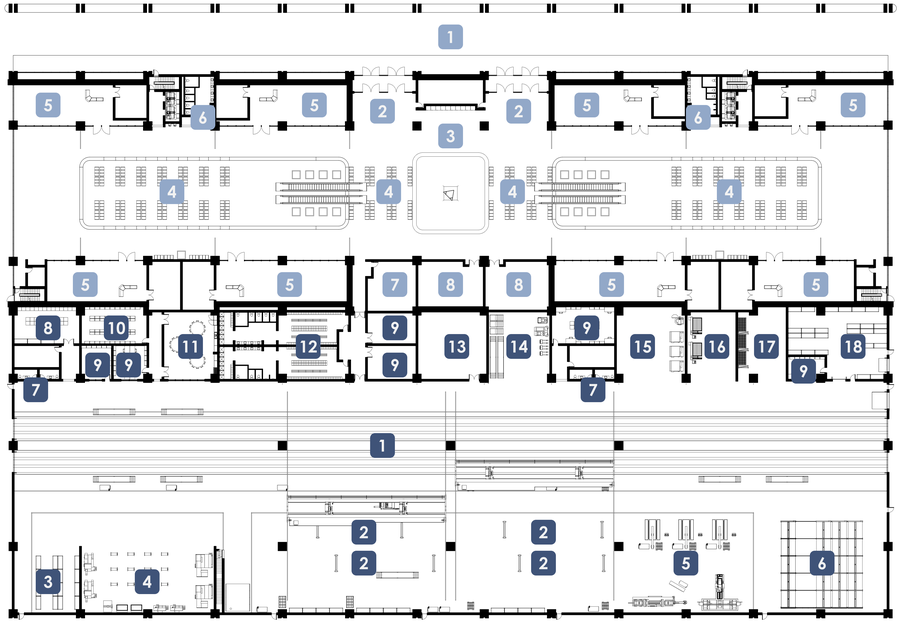
The idea behind this train station is a blend of new and existing designs in order to create a templatable floor plan design for future maglev train stations along the proposed maglev line. Outside of the plans of the train station, the overall form is meant to mimic the design of newer maglev trains. These trains have very aerodynamic shapes and organic forms in order to reach extremely high speeds. Around the exterior of the station, pre-existing walking trails have been modified and paved in order to allow pedestrians to walk around the grounds of the site and take in the beauty of the surrounding valley or to watch trains come into and out of the station.

THESIS PREMISE

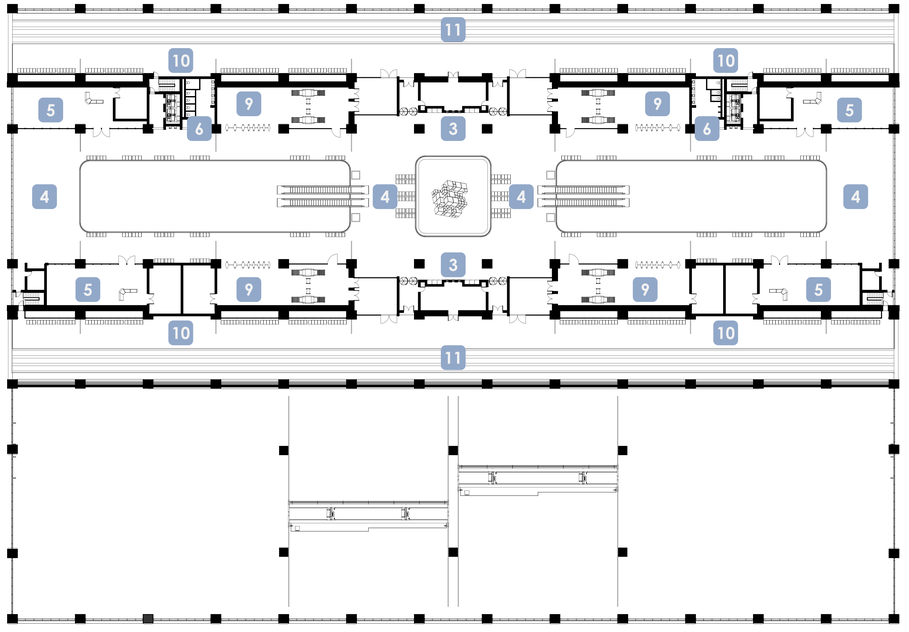
The underlying concept for this thesis project is the adoption of the latest technologies in magnetic levitation (maglev) in order to eventually replace the aging passenger rail system in the United States. With speeds in excess of 350mph, this technology can make passenger rail a more relevant choice compared to other transportation options such as car and plane

NIGHT RENDER

SITE RENDER



1ST FLOOR
1" = 30'-0"



2ND FLOOR
1" = 30'-0"

FLOOR PLAN KEY

PART 1: STATION

1. DROP-OFF
2. ENTRY
3. TICKETING
4. WAITING AREA
5. COMMERCIAL
6. BATHROOMS
7. ELECTRICAL
8. MECHANICAL
9. SECURITY
10. PLATFORM
11. MAGLEV TRACK

PART 2: MAINTENANCE

1. MAGLEV TRACK
2. REPAIR BAY
3. ITEMS STORAGE
4. CNC MACHINING
5. HEAVY REPAIR
6. BULK STORAGE
7. BATHROOMS
8. TOOL SHOP
8. TECHNICAL DOCUMENT STORAGE
10. MAINTENANCE OFFICE
11. BREAK ROOM
12. LOCKER ROOM
13. TOOLBOX STORAGE
14. COMMON WORK AREA
15. COMPONENT CLEANING
16. WATERJET MACHINES
17. WELDING AREA
18. SMALL PARTS STORAGE

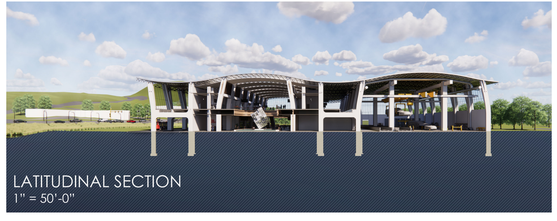
PERFORMANCE ANALYSIS

TIME TO STATIONS

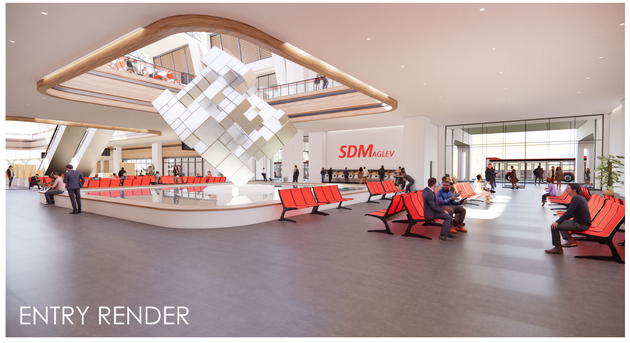
	LOCATION	DISTANCE	TIME
1.	SAN DIEGO, CA TO LOS ANGELES, CA	**120** MILES	**00** HR **20** MIN
2.	LOS ANGELES, CA TO LAS VEGAS, NV	**235** MILES	**00** HR **38** MIN
3.	LAS VEGAS, NV TO FLAGSTAFF, AZ	**210** MILES	**00** HR **34** MIN
4.	FLAGSTAFF,AZ TO ALBEQUERQUE, NM	**285** MILES	**00** HR **46** MIN
5.	ALBEQUERQUE, NM TO DALLAS, TX	**589** MILES	**01** HR **34** MIN
6.	DALLAS, TX TO MEMPHIS, TN	**421** MILES	**01** HR **08** MIN
6.	MEMPHIS, TN TO ST. LOUIS, MO	**240** MILES	**00** HR **38** MIN
7.	ST. LOUIS, MO TO CHICAGO, IL	**260** MILES	**00** HR **42** MIN
8.	CHICAGO, IL TO CLEVELAND, OH	**340** MILES	**00** HR **55** MIN
9.	CLEVLAND, OH TO PITTSBURG, PA	**120** MILES	**00** HR **20** MIN
10.	PITTSBURG, PA TO WASHINGTON D.C.	**190** MILES	**00** HR **31** MIN
11.	WASHINGTON D.C. TO BALTIMORE, MD	**35** MILES	**00** HR **12** MIN
12.	BALTIMORE, MD TO PHILIDELPHIA, PA	**90** MILES	**00** HR **25** MIN
13.	PHILIDELPHIA, PA TO NEW YORK CITY, NY	**80** MILES	**00** HR **23** MIN
14.	SAN DIEGO, CA TO NEW YORK CITY, NY	**3,215** MILES	**08** HR **35** MIN
15.	SAN DIEGO TO NEW YORK CITY (BY PLANE)	**2,433** MILES	**05** HR **25** MIN

LONGITUDINAL SECTION: STATION
1" = 50'-0"

LONGITUDINAL SECTION: MAINTENANCE
1" = 50'-0"



LATITUDINAL SECTION
1" = 50'-0"



ENTRY RENDER

As you walk in the doors to the train station, you are greeted by a large steel sculpture situated in a rectangular atrium. To the east wand west of the sculpture are the seating areas for people to wait for their train to arrive. To the south of the sculpture is a wall with rooms that lead to the mechanical, electrical and maintenance areas. To the north of the scupture and inbetween the two sets of entry doors is the first ticketing center for people to buy tickets to ride the train. The sculpture itself may appear familiar to some architecture students from NDSU and realize it is from spring semester of the first year of the architecture program. Hidden throughout this project, there are many more items such as this from previous years while in the program.

LOBBY RENDER

After walking past the main sculpture and ticketing area, you are presented with the lobby. Inside the lobby there are two sets of seating and escalators that bring you up to the second floor where the train platform's are located. Along the sides of the escalators, there are eight sculptures that are very similar to the cube located at the entry to the station. In order of how they are seen in the render, there is; th continual delay project, the brick project, the concrete project, the urban planning project, the boathouse project, the steel project, the wood project, and the high rise project.

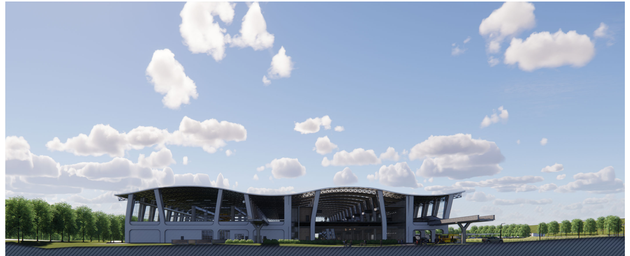
ATRIUM RENDER

Once you walk through the lobby and up the escalators or the elevator's, you will find yourself in the atrium. The atrium consists of two floors of seating area's for people to wait for their trains to arrive. In this area, there is also the commercial shops to help keep people occupied until their train arrives at the station. Additionally, there are the elevator's, bathroom's, and emergency stairwells located along the edges of the atrium. As far as hidden projects go, along the left side of the atrium, there is a painting of the Jobson house from first year as well as a sculpture of the Four by Four house from second year. This view also shows more of the eight projects mentioned in the Lobby paragraphs.

2ND FLOOR RENDER

In the direct middle of the atrium on the second floor, there is the heart of the train station, this area consists of the second set of ticketing booths for people to ride the trains as well as the security checkpoints for people to get their bags scanned prior to riding theri train to their destination at speeds north of 350 mph. For people leaving the platform, on either side of the ticketing booth there are exits for people to leave the station. Natural light is brought into this space with the skylights that stretch from one end of the atrium to the other at intervals of 40'-0", the same dimensions of the column grid. There are two projects in this render. Located at the tops of the escalators, there is the mid-rise project and the thesis prep project.

NORTH ELEVATION
1" = 50'-0"

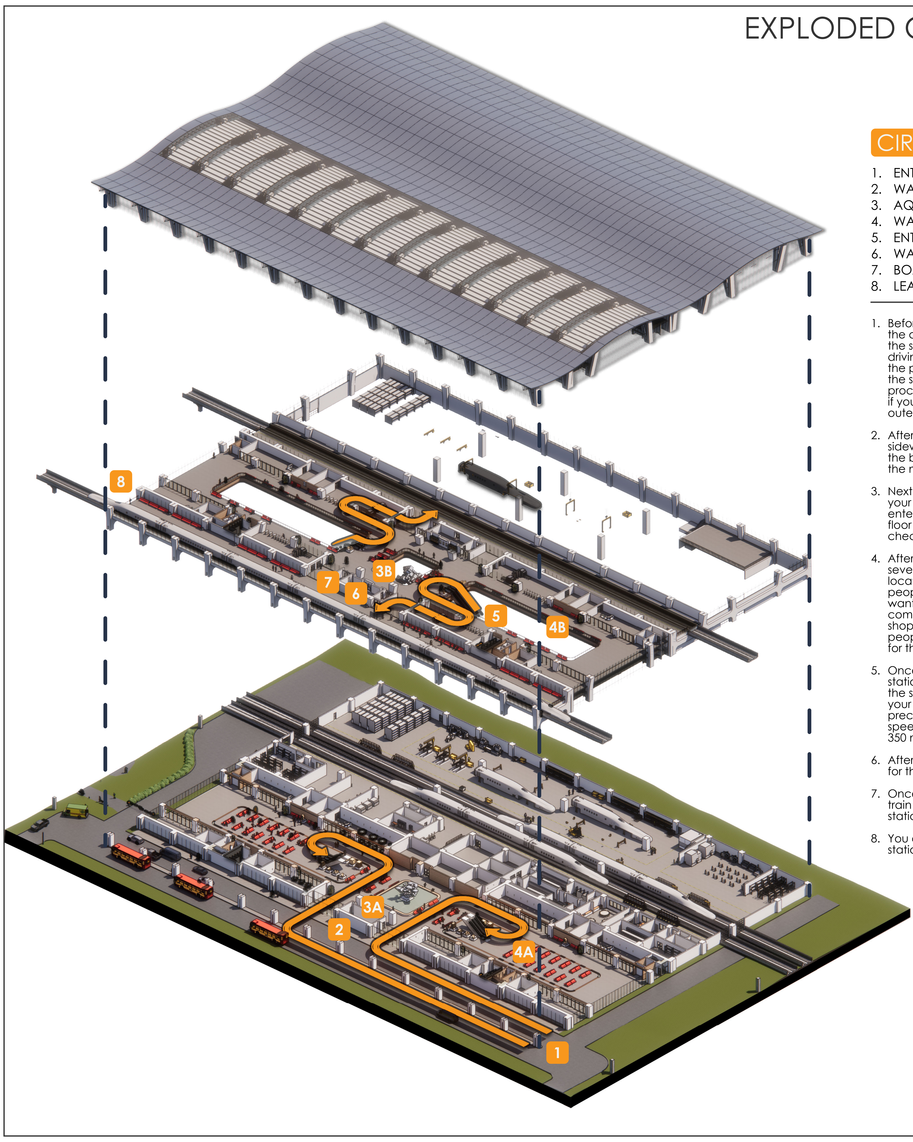


EAST ELEVATION
1" = 50'-0"

SOUTH ELEVATION
1" = 50'-0"

WEST ELEVATION
1" = 50'-0"

EXPLODED CIRCULATION DIAGRAM

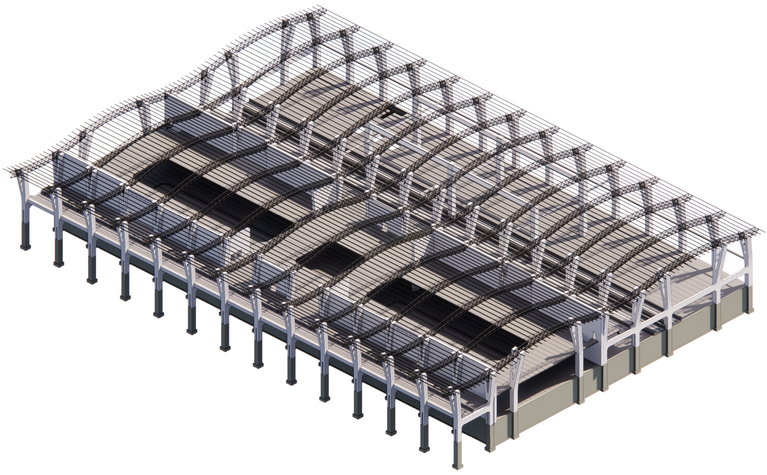


CIRCULATION PATH

1. ENTER SITE
2. WALK THROUGH FRONT DOORS
3. AQUIRE TICKETS AT ENTRY
4. WAIT FOR TRAIN TO ARRIVE
5. ENTER SECURITY TO CHECK BAGS
6. WALK ONTO PLATFORM
7. BOARD TRAIN
8. LEAVE FOR DESTINATION

1. Before getting to the point labeled in the diagram to the left, you arrive on the site either by car or bus. If you are driving your own vehicle, you park at the parking lot near the entrance to the site. If you are being dropped off, proceed to the inner-most traffic lane, if you are taking public transit then the outer-most lane.
2. Afterwards, you walk along the sidewalk located along the edge of the building before entering through the main doors.
3. Next, you can aquire your tickets for your train either on the first floor as you enter the building or on the second floor in-between the security checkpoints
4. After aquiring your tickets, there are several designated waiting areas located throughout the station for people to wait for their train. If you want any food, souvenir's or other commercial goods, there are twelve shops located inside the building for people to buy items from while waiting for their train.
5. Once your train is approaching the station, you will have to travel through the security checkpoint in order to get your luggage scanned. This is a safety precaution considering the operating speed of maglev trains are in excess of 350 miles per hour.
6. After security, you wait on the platform for the train to arrive.
7. Once the train arrives you board the train and wait for it to leave the station.
8. You are now on your way to the next station and your destination of choice

STRUCTURAL DIAGRAM



COLUMNS

The primary feature of this train station is its split-end columns which connect to the building's flowing roof. In total, there are about fourteen columns measuring 5'-0" x 5'-0" per longitudinal side. On the station half of the building, due to the intense loads created by the fifty foot floor canteliver and the maglev track, there are two rows of these columns on either side of the maglev track. These exterior columns are connected to each other essentially forming a 'super-column' that supports not only the second floor and all of its activities, but the roof as well. On the maintenance side of the building, since there is an abscence of a second floor, a less intensive structure is required. As such, it does not need the dual column grid of the station half of the building and only has one row.

ROOF AND FLOOR

Since one of the main themes of this thesis project is a floating (maglev) train, this is translated into the roof structure. A space frame roof was chosen in order to accurately mimic this. Connected only at three points throughout the building the space frame roof travels over 140 feet in-between supporting columns and load-bearing walls.
The floor of the building canteliver's fifty feet in some areas while in other area's it travels the whole 140 feet across the building. In order to do this, it is connected at the columns with a six foot deep floor structure for the canteilvers. The area's where it the floor travels more than fifty feet is supported by nearby columns or load-bearing walls in order to reduce the size of the columns wherever possible. On thing to note, this structural view is missing the innermost column grid which is present in the renders but not in the structural view. The reason behind this is that those columns and walls are not load-bearing and the entire building is primarily supported from three areas; the north column grid, the middle column grid, and the southern column grid.

MAINTENANCE AREA RENDER

PLATFORM RENDER

DAYTIME RENDER