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I, Daniel Coleman, hereby submit this original work as part of the requirements for the degree of Master of Architecture in Architecture.

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The Modern Stadium as an Urban Epicenter

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The Modern Stadium as an Urban Epicenter

A thesis submitted to the
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by

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The modern stadium is a bipolar anomaly of the architectural world. They are built to hold large masses of people for short intervals of time, constantly juggling between satiated and famished. Their lifespan is relatively short and they are under constant pressure to keep up with the changing times. Often constrained by factors of transportation, circulation, life safety, and sheer cost, the stadium has become a static environment that does not offer much past a few hours of entertainment. Additionally, advancements in home theater technology have created competition, and make it difficult to get people to leave their homes for an event. The challenge is to change the role of the stadium within the community and to redefine it as an urban epicenter for activity and connection.

This thesis proposes a Nordic ski jumping stadium in the heart of downtown Detroit, Michigan suggesting how the stadium can become a beacon for a city, an amenity to the community, and a location for pulse-pounding feats of human athleticism.

Nine variables have been identified to define what makes an active, memorable, vibrant, positive experience for a spectator at a stadium: These include the physical variables of climate, connectivity, and visibility and acoustics; the emotional factors of memories, perception, and engagement; and the spatial conditions of program, materiality, and form.

Placing the project within the urban fabric strengthens the entertainment district, and helps draw people to the stadium every day of the year. Juxtapositions between everyday activities and the stadium were also created and exploited, in order to create idiosyncratic vignettes of connection.
TABLE OF CONTENTS

1 ARCHITECTURAL PROBLEM
3 BACKGROUND
7 PRECEDENT REVIEW
11 BACKGROUND SUMMARY
13 PROPOSITION
15 DESIGN GOALS
17 SITE AND CONTEXT
31 SITE DIAGRAMS
35 CLIENT AND CULTURE
39 PROGRAMMATIC GOALS
40 ACTIVITIES AND FUNCTIONS
41 USER SPECIFIC PROGRAM
51 EXPERIENTIAL PROGRAM
55 FUTURE SPACES
57 BIG PICTURE
59 BIBLIOGRAPHY
People are not attending sporting events with the same frequency that they have in the past, leading to underutilized stadia. The advent of high definition television and improvement in home theater technology are contributing to people staying home from sporting events. The challenge is to make the stadium experience significantly unique, in order to draw people from their living room. How can the social and athletic interaction, and the architectural design of a stadium, create a unique event that can only be experienced by attending the venue?

Additionally, the trend in stadium construction over the last three decades was to move the stadium to the outskirts of a city to provide expansive parking. This trend made the stadium an island that was only utilized on a few days of the year. In an effort to make the stadium an epicenter of activity, it is imperative to move it back to the metropolis to encourage people to engage with the structure on a daily basis.
The stadium in its historical roots was a gathering place for the public to socially interact and take in entertaining stimuli. The early stadium has many elements that are still used in the construction of stadia today. “Greek stadia (foot racecourses) were laid out in a U-shape, with the straight end forming the starting line.”

This historical investigation highlights formal elements from stadia built in ancient societies that are still prevalent in planning exercises today. It is still common to see stadia organized in a U-shape or an oval shape, mimicking Greek and Roman examples.

Fast forwarding into modern time, the activity of the stadium has not been altered much. It is still a large building that houses an event that people attend to be entertained. However, advancement in media technology has led to a wider availability for crisp video feeds and up to the second information. The stadium experience for a fan is losing the unique emotional connection and people are more content watching events from their homes. This statement is supported by CNN author Sheena McKenzie in the article, “Sports Stadium Architecture: Welcome to the New Temples of Pleasure.” She writes, “In an age where sporting events are captured on television in brilliant detail, designers must lure us from the comfort of living rooms with multipurpose entertainment centers.”

Financial barriers are also to blame for declining fan populations. The cost of attending a sporting event has exploded in an effort to keep up with the high operational costs of contemporary stadia. People are not willing to spend the money necessary to go to a stadium when they can see the action close up on their television and have the comforts of home. Given these causes of the problem, the stadium still holds a lore within the sporting world, and people will always like to say, “I was there,” when reminiscing about a specific historical event. The questions then become, how does the stadium adapt in this new age of information, and what new approaches can be taken in order to create an exhilarating stadium experience?

How does the stadium become an active place, where people meet, play, and relax, on a daily basis? How can the architecture and organization of the stadium enhance the interactions of people and influence their experiences? Before examining the impact of architecture on experience in sports facilities, it must first be acknowledged that there are many other factors of sports and entertainment that will impact the spectator greatly. Primarily, in team sport atmospheres, it may be as simple as if the home team won or lost. Spectators may feel leaving joyful if their team wins “the big game,” or, depressed if their team loses. Secondly, a great individual athletic performance can have an impact on spectator experience. For example, in Major League Baseball, there are 162 regular season games, and the importance of one particular game can be diluted. However, if a pitcher throws a no-hitter, or a batter hits for the cycle, then fans will have rare memories of the game.

Events of the past may play an impact of spectator experience as well. For example, Wrigley Field, in Chicago and Fenway Park in Boston, have been hosting games for over 100 years. There is a certain lore that is instilled into these stadia and a unique feeling, knowing the events that have happened in the past. It is these historical moments, and memories, that create nostalgia that make experience great.

The sport of ski jumping is exhilarating to experience as a spectator. To the person that has not watched the sport in person before, the first time is a shocking experience to see a human being hurl themselves off of a man-made cliff, at 60 miles per hour, and fly through the air hundreds of yards. Using architecture to situate offices, apartments, retail, restaurants, and public space close to this action, provides a distinctive sport viewing experience for spectators.

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The stadium is an enigma in the architectural world. The program for the built form is straight-forward and repeated in all stadia. It must offer a place to compete in a sporting event within the rules and regulations of the sporting body, plus additional amenities, technologies, and experiences that can be controlled by the designer. Architects are well versed in designing spaces that can convey certain emotions, feelings, and experiences for a visitor. Yet, with a stadium, the experience of the spectator is heavily reliant on the outcome of the sporting event. The joy of an emotional win and the devastation of a crushing defeat can leave spectators in a plethora of emotional states when leaving. It then becomes a challenge to the architect to ensure that the experience of the spectator is balanced enough that they wish to return to the stadium. There are some architecture firms that specialize in stadium design and address these issues daily. Populous is the premiere global firm in stadium design. They release many publications that address issues within stadiums and the future trends coming on the horizon. The research and publications completed by Populous have served as a primary resource for this research.
Two prior works are integral for understanding the nuances of ski jump design. An in-depth summary and critique of the Holmenkollen Ski Jump by JDS Architects and Bergisel Ski Jump by Zaha Hadid will offer rich insight into specific design principles for this building type.

The Holmenkollen Ski Jump, located in Oslo, Norway is named after the small neighborhood where it is located. Ski jumping competitions have been held on the Holmenkollen hill since 1892 but the current stadium was not constructed until 2010. In the past, there have been several iterations of structures built on this site, but the most modern structure, designed by JDS Architecture, is the most relevant example. This site is referred to as the birth place of modern ski jumping. It has a very important historical significance for Norway, and for those familiar with the sport all around the world. The stadium, as seen in the corresponding images, is built into the hillside and presses the spectators as close to the action as possible. There are many programmatic aspects of this project that make it a significant precedent. Not only does the site have a ski jump with a stadium that holds 30,000 spectators, but it also has a ski history museum, a banquet center, training facilities, and a pedestrian lookout tower. These programmatic elements ensure that the site and structure remain populated in the summer months when there is no snow. According to the Holmenkollen visitor website, “Holmenkollen tower has over 250,000 visitors a year, from all over the world.”

Aside from the programmatic elements, there are details in the design that are derived from the needs of ski jumping. Lining the in-run, or hill portion before the takeoff, there is a permanent wind screen. As cited on the Holmenkollen visitor website, the wind screen blocks, “45-50% of the direct wind.” That is a significant reduction, given that athlete performance in the sport is highly reliant on favorable weather conditions.
In addition to the Holmenkollen Ski Jump, in depth research has been completed on the Bergisel Ski Jump, designed by Zaha Hadid. The Bergisel Ski Jump and accompanying stadium is located in Innsbruck, Austria, and has a capacity of 28,000 spectators. Similarly to the Holmenkollen stadium location, there is a rich history of ski jumping on the site, but the current stadium was completed in 2002. This stadium is a useful precedent for a variety of reasons, including programmatic organization, additional stadium amenities, and construction details. From a programmatic standpoint, the Bergisel Ski Jump takes a more traditional ski jump stadium approach. The key elements including the judge’s hut, coach’s box, athlete house, and jump are all separate. Yet, it is interesting to look at how all of the individual pieces come together to make one concise stadium. A unique addition to Bergisel is a restaurant that is located at the top of the tower. It offers full panoramic views of the surrounding mountains and a unique perspective from which to watch a competition. According to the stadium’s website, the restaurant offers seating for 100 and is rented out year-round for private functions. This is an important additional stadium amenity because it offers revenue opportunity all year. From a design perspective, the Bergisel Ski Jump is has many interesting details worth investigation. The stadium bowl is open on one side, allowing for a plaza where socialization can happen while still being connected to the event. The seating wraps around and up the hill to offer a variety of vision lines of the action. This half bowl shape is also important because in the summer months the stadium is transformed into a concert venue. The surface treatment of the hill is also noteworthy, because it is coated with a special plastic lattice. This detail allows for ski jump training to happen in the summer months while still providing a safe and practical facility. For this thesis design investigation, different types of amenities will be examined. Conclusions will be suggested as to how they can activate the space and increase spectator experience.
In response to the precedents studied, main topics and goals can be extracted:

- How does technology correlate in a stadium experience?
  - What technologies are unique?
  - What are future technologies to plan for?
  - Is social media the only answer?
- How can the senses and memories affect experience?
  - How can new memories be made?
  - Does a significant event have to happen for a memory to become engrained?
  - How can we feel nostalgic about a new place?
- Are the recommendations presented in the texts the only way to design?
  - Is the stadium seating flexible?
  - Can public space be integrated at a larger scale?
- How will the specific needs of the sport of ski jumping impact the architectural design?
  - Environmental factors
  - Seasonal needs and changes
  - Training and learning the sport

- How will European ideas of ski jumping translate into the American culture and context?
- Can the stadium become a social hub and urban focus?
- What are the limitations of a mixed use stadium?
- How can multiple program spaces be integrated into one form?
- What can be done to ensure fan comfort in the elements?
- Can a retractable roof be put on a ski jumping stadium?
It was the intention of this thesis to design a Nordic ski jumping stadium that will advance the way that the sport is experienced by the spectator and the way that the stadium is utilized by the community. In order to ensure that these goals were met, care was taken to research successful precedents and discover what programmatic elements will contribute to an active destination. These programmatic elements of a stadium were then repurposed and integrated into secondary building typologies creating program juxtapositions.

The awe-inspiring beauty of the sport of ski jumping is something that everyone should witness. By designing a performance and training facility within the metropolitan area of Detroit, Michigan, the availability of opportunities to witness the sport will dramatically rise. The location of Detroit is ideal because it is located on a major international border with Ontario, Canada. The facility will therefore become an international destination for spectators, aspiring athletes, and international competitions.

Ski jumping is a sport that many Americans are only exposed to every four years during the winter Olympics. It is a thrilling, mesmerizing sport that combines physics, athletics, and architecture in perfect harmony. In order for an athlete to be successful in the sport they must have a grasp of the general physics and kinetics behind the activity. They must understand aerodynamics, kinetic energy, and gravitational forces. There is also an inherent level of physical ability that must be present for an athlete to be successful.

What may go unnoticed is that the designer of the ski jump hill has a large role in the success of the jumpers. Below is a list of items that are influenced by design that impact the sport of ski jumping:

- The height and steepness of the in-run
- The height and positioning of the takeoff table
- The slope of the hill
- The orientation of the stadium (keeping in mind prevailing winds)
- Interventions to control lateral winds
- Stadium form to reduce wind swirling
- Direct sunlight’s affect the snow surface
- Facilities for athletes
To create a homogeneous stadium design, many of the design program requirements will be combined into the same structure. One major design driver is the creation of a hill. The location for the project is in an area that has minimal natural topography. Man-made topography is used to house some of the programmatic elements, integrating program into the landscape. It is also within the design intent to link the stadium to the metropolitan area, through visual connections and physical connection of transportation. The most intriguing portion of this study is the investigation of how stadium spaces cross over into everyday activity spaces. The interactions of people that are living and working in the surrounding spaces of the stadium are a major focus and are of innovation in the project.
The proposed architectural project is set in Detroit, Michigan. Specifically, the site is bordered on the West by Cass Ave., on the South by West Adams Ave., on the East by Park Ave., and the North by East Fisher Freeway Service Drive. The proposed area is visualized in the diagram below, showing the context within the overall urban fabric of Detroit.

This image is a view of the proposed site from the North border. It can be seen in this image that the majority of the site is cleared and is currently parking. Directly behind the camera is an interstate freeway that has five lanes of traffic traveling each way. The freeway is submerged into the ground approximately 30 feet.

The above image is looking south while traveling down Grand River Avenue, on the West of the site. The black fencing is the border of the site. It can be seen that this plot of land is currently being utilized as a parking lot and is not developed. To the south, portions of Detroit's skyline are visible.

The above image is the view of the Southeast corner of the proposed site. Currently there are two eleven story buildings that used to be housing. They have been abandoned for some time and are in disrepair. The image shows that there are many missing windows and that the ground floors are completely gutted. The removal of these buildings would not only improve the appearance of the community but it would also open up that corner for connection to the Grand Circus Park which is across the intersection of Adams and Park. This corner will become the focal point of the architectural intervention. It will become a safe gathering place for the community to spend time together.
Detroit, Michigan has been somewhat infamous recently with national media outlets, covering the decay and corruption within the city limits. The city is an interesting case study for architects, urban planners, sociologists, and a plethora of other fields of study. The past century of Detroit is full of dramatic highs and lows that have shaped the culture, people, architecture, and attitudes of the city. Today, the city of Detroit is a proud, misunderstood, beautiful place that deserves to have its place in the sun once again.

Given all of the negative publicity and events that have happened in Detroit since World War Two, there are some positive efforts being made to improve the city and return it to the promise of the past. Two business moguls, Mike Ilitch and Dan Gilbert, have made it their personal mission to return the city of Detroit to glory. They have purchased a majority of the land that was vacant and decrepit and are working towards developing it, in an effort to draw people back downtown.

There is one thing that brings people back downtown, time after time: the local sports teams. The people of Detroit are extremely passionate about their professional sports teams and support them fervently. The Major League Baseball Tigers, National Football League Lions, and National Hockey League Red Wings all have their home stadiums in central downtown Detroit. They are a huge draw for local businesses and offer an opportunity to attract people to relocate downtown. Detroit is also home to three newer casinos that are an attraction for people from the suburbs. They are very popular on the weekends with people from the area and tourists.
The proposed site for the architectural intervention is approximately 400,000 square feet, bordered on all sides by pedestrian sidewalks and vehicular roadways. Currently, there are multiple secondary roadways penetrating the site that will need to be addressed in order to reroute traffic around the perimeter. As it currently sits, there are five small buildings inhabiting plots in the site. Only one of these buildings is inhabited and it is proposed that these buildings are demolished to clear the site for the project. Topographically, the city of Detroit is relatively flat. There is very little grade change, given that most of the city has been graded and covered with hardscape.
A second environmental factor that will help in informing design decisions is the average temperature of the region. As it can be visualized in the chart, the average temperature is slightly below the national average temperature. However, there is one important factor that can be observed from this chart that will greatly affect the design decisions. For eight months out of the year, the low temperature is above the freezing point, meaning that a ski complex will not be able to rely on natural snow at all times. This will just mean that there will need to be an artificial skiing surface installed which will have consequences on structural solutions and MEP requirements.

The following set of data and information will explain the climatic norms in the city of Detroit and how that will inform future design decisions. The activity of ski jumping can be heavily impacted by the elements and it will be important to design a building that will provide a controlled environment for practice and competition. The most important environmental factor that will need to be controlled for a proper ski jumping hill is wind. The wind speed and direction can greatly impact the results of a ski jumping competition.

This wind speed chart shows that the city of Detroit has a slightly higher average wind speed than the national average. This solidifies the notion that the architectural intervention will have to be specifically designed to shield wind from the ski jumping area. A wind speed of 10 miles per hour can cause unsafe conditions for ski jumping and this chart shows that in the winter months the average wind speed is higher. A design solution will be to use the building to shield the prevailing winds in an attempt to create a more tranquil athletic environment.

This wind rose shows the average wind speed in correlation to the direction in which it is coming from. It can be inferred that a majority of the wind on an annual basis comes from the westerly direction. It is far more uncommon for the wind to come from the east. This differentiation will aid in decision making for the proposed design, because it will be important to try and reduce direct wind from the ski jump. The conclusion that can be reached is that it will be important to focus most of the mass of the building on the western side of the site, in an effort to block the wind. Special attention will also need to be paid to the corners and edges to study the swirling patterns and ebbing of the wind.

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Figure 3: Climate Consultant Energy Design Tools

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Figure 4: Climate Consultant Energy Design Tools

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Figure 5: Average Temperatures

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Figure 6: Wind Speed (mph)
BUILT CONTEXT

Looking at the site from a macro scale it is first important to evaluate how the city of Detroit is laid out. Unlike most other cities, the city of Detroit is planned in a radial scheme that represents the spoke wheel that built the very city. The plan can be seen in the figure ground map.

The major roads that penetrate out into the suburbs make up the spokes of the wheel and the secondary roads are laid out in a grid pattern to connect the major roads. At the center of the wheel is Grand Circus Park. Following the Detroit fire of 1805 the city was planned a second time to incorporate public green space within the city center. The major roadways all lead to this park and it is the central focus of the city. The architectural intervention that will be proposed should take great care to address this park. Creating another public space on the Southeastern corner of the proposed site would create a communication between the two spaces and expand the public realm within the city center.

Detroit was built by the automobile industry and remains to embrace the automobile today. It is a city that is heavily reliant on automobile transportation; however, there are a few transportation alternatives. There is a monorail system that runs through the downtown known as the people mover. The route can be seen in the image to the left. There are thirteen stations around the downtown area including a station at Grand Circus Park that would service the architectural intervention on the proposed site. The People Mover first began operation in 1987 and it is built to handle a capacity of 15 million riders annually. Most of the riders are using it during the weekends when there is a higher population of tourists in the city.

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Figure: Map of People Mover Stops
http://maps.stamen.com/
A second form of transportation within the city of Detroit is public busses. There are two bus systems that run through the city of Detroit, the DDOT and the SMART bus. The DDOT (Detroit Department of Transportation) busses run throughout the city limits at all hours, day and night. The SMART (Suburban Mobility Authority for Regional Transportation) busses extend their reach into the suburbs, but do not run as frequently.

The map shows the routes of the busses within the city limits of Detroit and how frequently they run. On the two bus systems there are a combined 140,000 daily riders that utilize the buses to get to and from work.

Throughout the last half century, Detroit has made efforts to expand the public transportation system by adding a light rail system. Budget cuts and political pressure by the automotive companies have kept those plans from coming to fruition.

Recently, Detroit has been able to shake the pressure and approve a plan for a light rail system that will travel into the suburbs. It is referred to as the M1 rail and began construction in July of 2014. The preliminary route will be along Woodward Avenue, from Campus Martius Park, to the New Center in North downtown. The hope is that the second phase of the project will branch out from this preliminary phase and become a cohesive system of transportation throughout the city and the surrounding areas. This preliminary M1 line will have a stop at the Grand Circus Park and will be able to aid pedestrians in easy transportation to the proposed site for architectural intervention.
SITE RESPONSE STRATEGIES

Following an intense evaluation of the proposed site and the forces that will affect design decision-making, some themes and strategies can be formulated. These strategies can be condensed into a list of site approaches and strategies as follows:

- Create a connection along West Adams Ave. to the existing entertainment buildings.
- Create an active streetscape on West Adams Ave.
- Address and link to Grand Circus Park.
- Create a civic space for the public to utilize on the Southwest portion of the proposed site that addresses the city and the program of the architecture.
- Integrate a wind screen into the architecture in order to ensure favorable ski jumping conditions.
- Relate architectural aesthetic to the sport of ski jumping, the origins of the sport, and the city of Detroit.
- Adhere to all of the regulations suggested by the FIS in order to create a world class ski jumping hill and facility.
- Study the ideal conditions for the spectator bowl and implement a situation that will ensure the best possible viewing angles and experience.
This diagram defines the relationship to the local interstates. The site is bordered by I-75, which travels from Florida to Ontario, Canada. It carries heavy commercial and civilian traffic and is one of two main routes into the city.

This diagram is further defining the connection between the proposed site and the existing entertainment structures. West Adams Avenue will become the main entertainment district thoroughfare.
Offering a location that nurtures public interaction and pairing that with a sporting event influences the fan experience in a positive way. There is an unnecessary divide between the social interaction that happens outside a stadium, and the structured manner of viewing within the stadium. Blending these two ideas together and giving the spectator a choice about how they choose to experience the sporting event is key in the investigation. It is the desire to create a stadium that is a combination between a public plaza and a sporting facility. Bringing the social activity of the tailgate, for example, inside during the sporting event would make for an interesting spectator experience. This idea spawns from research visits to the Pine Mountain ski jump in Iron Mountain, Michigan. During this international ski jumping event there are around 10,000 spectators that flock to a small man made structure. The parking lot at the base of the hill is sectioned off and rented out to people that wish to watch the event. Within each space, spectators construct shelters with plywood and other inexpensive materials. This pop up village becomes highly activated during the event and it changes year to year. It is the intent of the stadium thesis project to incorporate the ingenuity of the spectator in construction of the viewing experience. Through the exhaustive process of research, design, iteration, and mastery, the social experience of the stadium evolved in both understanding and implementation.
Given the climate of Michigan, the residents spend half of the year in cold climate temperatures, but they do not stay indoors. Common activities include downhill skiing, cross-country skiing, snowmobiling, ice skating, hockey, snow shoeing, and ice fishing. A less known amenity of Michigan is the Pine Mountain Ski Jump. This facility is the largest man made ski hill in North America and it is also the current site of the North American Ski Jumping Hall of Fame.

The FIS, city of Detroit, and Michiganders would all benefit from the construction of a new Eastern headquarters, training facility, and ski jumping stadium. This complex would be an opportunity for the FIS to expand their operations and increase visibility and availability. The city of Detroit would benefit from a unique stadium because it would be a year round tourism draw. The city would also benefit from having a designed space that is intended for use by the public to gather and interact. The citizens of the state of Michigan would benefit for the same reasons that the city of Detroit would. The citizens would have an additional amenity that would provide entertainment and exposure to a new sporting event. It would also give local athletes the capability to try their hand at the sports that they may not have been able to try before.

Historically, the stadium was a place for people to gather and view an event for entertainment. Centuries later, the program of the stadium remains the same with some advancement due to developments in construction methods and technology. The stadium is somewhat of an architectural enigma. The athletic outcome and the emotional implications involved are unpredictable, but the architect has to be able to use design to ensure a positive fan experience. With the emotions tied to sports and fandom, a losing team may cause a negative environment. The architect must use their expertise to try and avoid this issue. Stadiums have emotions and memories attached to them. Historical events happen within their walls. People will form memories and associations with events that they attended at a stadium. Stadiums build relationships, memories, and history.

CLIENT AND CULTURE

For this proposal, the fictional client will be the International Ski Federation, (FIS). The FIS is a private governing body that promotes the downhill, Nordic, and freestyle skiing sports. It is the goal of the FIS to expand the scope of awareness of the skiing sports and get more people to compete and participate in them. Funding for the FIS comes from membership dues and advertising contracts for companies to gain exposure during their sanctioned events. It is the responsibility of the FIS to provide and review rules and regulations, promote the sporting events, ensure fair treatment of athletes, sponsor development activities, and hold meetings to discuss future changes to the sports.

For this thesis project, a fictional situation has been developed, where the FIS would like to expand their operations into the Eastern portion of the United States. Currently the headquarters for the FIS is located in Salt Lake City, Utah. For this situation, the FIS has formulated a plan to expand, in order to increase their exposure to the public, in an effort to raise awareness of their brand and the sports they represent. It is the intention of the organization to split their operations between the headquarters in Salt Lake City and the new location in the Eastern United States. The specific site chosen is Detroit, Michigan. Many positive factors have gone into the choice of Detroit. First, Detroit is located at the most traveled international border in the United States. The Detroit – Windsor, Ontario border is heavily trafficked and would be an ideal place for an international federation to have access to both Canadian and United States prospective athletes.

Secondly, Detroit already has an established winter sporting culture. Currently the metropolitan Detroit area is home to the highest population of international ice dancing athletes. There are state-of-the-art facilities in place to train the most elite athletes in skating that are better than any other place in the world. Thirly, the people of Michigan are appreciative of winter sporting activities.

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An archetypal example would be the Colosseum in Rome, Italy. This public stadium was used to house the masses to view entertainment. The governing bodies held events for the public to raise morale during times of harsh living conditions. Today, stadiums and events can have the same effect. A person may travel to a stadium to view an event that may last only a few hours, but may transport them to a different state of mind and emotion. With the emotional power in modern society, the stadium today is akin to the cathedrals of old. “Inside these temples to physical feats, language evokes the divine — fearful fans ‘pray for a miracle,’ while losing prompts serious ‘soul-searching.’”

It is the intention in this design problem to include a multitude of spaces and study the interactions of the spaces and how they impact the viewing experience of the sport. There will be private spaces that will be used for athletic training and development, public spaces that will be used for community gathering and involvement, and viewing spaces that are used for pleasure and entertainment. A combination of these spaces and how they interact govern the design process, in the attempt to design a successful stadium that performs to the expectations of the client, the city, and the public.

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Programmatic Goals

Stadiums by definition are all fairly similar in their architectural components. They have a seating bowl that is specifically calculated to view the action, a surface for athletics, and amenities to serve the spectators, such as restrooms and concessions. Aside from that, it is up to the architect to suggest to the client other amenities that will make the stadium unique and increase positive experiences for spectators and increase revenues. Stadiums also have the appearance of being contained and shut off from the outside. This is partially because of the necessity for security, but it would make for a unique stadium experience to find a way to connect the inside with the community. This could be done by drawing the secure line closer to the athletic surface and during competition time, controlling that plaza with a variable secure line. The following are goals that were addressed in the stadium design:

1. Develop a stadium program, for a mixed-use facility, were the primary activity is the development and performance of Nordic Ski Jumping athletes.
2. Formulate a plan to integrate the stadium design and program into an urban context, utilizing the project to act as a catalyst for social activity.
3. Blend the program of a stadium and a social environment together to create a range of unique spectator experiences.
4. Weave digital, social, and connectivity technologies into the architecture of the stadium, to provide a spectator experience that cannot be obtained anywhere else.

Activities and Functions

1. Host world-class athletes to compete in international competitions within the sport of ski jumping.
2. Provide a place for ski jumping athletes to train, develop their skills, and compete against one another.
3. Host major concerts and performances from musical talent.
4. Host conventions and rallies for political, corporate, government, and charitable organizations.
5. Provide a place for community members to gather and socialize.
6. Provide amenity space for the community to be rented to host events, both indoors and outdoors.
7. Create a link to other key event spaces within the context and connect to create a hub for commerce, recreation, and activity for citizens, and tourists.
8. Connect with public transportation to allow for people from surrounding communities to easily access the facility.
9. Act as an iconic element in the city skyline and provide a source of pride for the local community.
1. International Athlete

1.2. Travel to and from the facility will most likely be by chauffeur, so there will need to be a convenient and secure spot for the athlete to be dropped off and picked up.

1.2.1. Safe, secure locations to store personal belongings and equipment should be provided for athletes. Laundry service and equipment maintenance should be included.

1.2.2. Facilities for personal hygiene and grooming should be provided to the athletes.

1.2.3. Areas for athletes to relax and take a break from the mental and physical rigors of sport.

1.2.4. Medical attention and physical therapy will be needed for athletes, to maintain their peak physical abilities.

1.2.5. Food and beverage facilities for the athletes.

1.2.6. Training and fitness facilities to remain in peak physical condition, including, weight room, cardio area, and warm up and stretching areas.

1.3. Coaching Staffs

1.3.1. Office areas to meet with their athletes and discuss conditions and strategies.

1.3.2. Safe, secure locations to store personal belongings.

1.3.3. Offices for permanent coaches.

1.3.4. Lounge area for visiting coaches.

1.3.5. Media room for viewing film with athletes.

1. Domestic Athlete

1.1. Travel to the facility is most likely to happen via automobile. It will be necessary to provide secure parking and access to the athletic facilities.

1.1.1. Training and personal development for a world class athlete is a full time job, therefore, amenities and comforts should be provided to the athlete, given they will be spending many hours on site.

1.1.2. Safe, secure locations to store personal belongings and equipment should be provided for athletes. Long term storage, laundry service, and equipment maintenance is included in these amenities.

1.1.3. Facilities for personal hygiene and grooming should be provided to the athletes.

1.1.4. Areas for athletes to relax and take a break from the mental and physical rigors of sport.

1.1.5. Medical attention and physical therapy will be needed for athletes, to maintain their peak physical abilities.

1.1.6. Food and beverage facilities for the athletes.

1.1.7. Training and fitness facilities to remain in peak physical condition, including, weight room, cardio area, and warm up and stretching areas.
THE SPECTATOR

2.1. General admission seating area for viewing events
   2.1.1. Concourse restrooms
   2.1.2. Concourse Concessions
   2.1.3. Concourse Retail

2.2. Club seating for viewing events
   2.2.1. Club seating lounge
   2.2.2. Club seating private restrooms
   2.2.3. Club seating concessions

2.3. Luxury Suites
   2.3.1. Private restrooms for suite users

Figure 6: Fans Cheering their team
http://commons.wikimedia.org/wiki/ File:Crowd_cheering,_Hong_Kong_Sevens_2009.jpg
THE EMPLOYEE

3.1. Operations Employees

3.1.1. These employees are most likely associated with the FIS or the operations of the facility. Included in this classification are managerial staff, office staff, grounds keeping, and the heads of each of the employee groups.

3.1.2. Offices for operations that have areas for conference, receptionists, and waiting areas.

3.1.3. Conference room equipped with video conferencing capabilities to converse with other offices.

3.1.4. Break room area or employee lounge.

3.1.5. Storage spaces for all of the different groups of employees.

3.1.6. Private restrooms for each group of office employees.

3.2. Event Employees

3.2.1. These employees are responsible for the operations of the facility on the day of events, and include the retail and concessions, ticket sales, security, first aid, janitorial, maintenance, and public relations.

3.2.2. Locker rooms for employee groups near to a private entrance.

3.2.3. Secure storage and parking for the employees.

3.2.4. Concession stands for the food retail

3.2.5. Retail spaces for sales of merchandise.

3.2.6. First aid office with waiting room area and offices for medical staff.

3.2.7. Storage spaces for each of the listed groups.

3.2.8. Ticket sales office with POS stations.

3.2.9. Security office for viewing of video.

3.2.10. Holding area for security threats.
3.3. Media Employees

3.3.1. This group of employees includes the television, radio, IT, and statistical employees that work during the events.

3.3.2. Press boxes for viewing the events

3.3.3. Media lounge for informational sessions

3.3.4. Interview and press release room

3.3.5. Server rooms

3.3.6. Camera stands and tracks

3.3.7. Storage rooms
TRANSPORTATION

4.1. Vehicular

4.1.1. Parking structure to handle visitors for a variety of activities and replacement spots for the lots displaced on site.

4.2. Public

4.2.1. Detroit People Mover light rail that runs throughout the city could be accessed to aid in people traveling within the city.

4.2.2. Detroit Rosa Parks Bus Depot close by and accessible for people traveling in within and around the city.

4.2.3. Proposed M1 Light Rail that will link Detroit to the suburbs and increase the accessibility for people to come downtown.
EXPERIENTIAL PROGRAM

WAYFINDING

1.1. Local Signage for people traveling to the stadium.

1.2. Clearly marked entrances for the parking structure, the drop off area, and the stadium entrances.

1.3. Clearly marked amenities within the stadium for ease of location and traveling to seats, restrooms, concessions, and retail.

1.4. Using the building as a wayfinding sign for the city. Architecture and lighting will make the stadium a landmark within the city.

TECHNOLOGY

2.1. Video boards to show live action and replays of the action.

2.2. Wi-fi connectivity for increased internet speeds.

2.3. Integrated building skin technology to turn the facade system into a video screen, to enhance architecture.

2.4. Sound systems to ensure clarity of announcements, concerts, and speeches.
COMMUNITY

3.1. Open public space for gatherings and leisure.
3.2. Green space to break up the hardscape of the urban fabric.
3.3. Connection to public transportation and the future plan for the M1 light rail.
3.4. Direct connection of the public plaza with the stadium to allow for interaction with the activities that are happening within the stadium bowl.
3.5. Plaza to incorporate safe water feature for children to play in during summer months.
3.6. Spaces within the stadium that will be rentable to outside entities for conferencing and meetings.
3.7. Concession spaces that will be open to both the inside and outside of the stadium, acting as an amenity to the public.

ENVIRONMENT

4.1. Wind screen to ensure the best conditions for the athletic events.
4.2. All weather surface for ideal skiing conditions year round.
4.3. Utilization of materials to take advantage of passive environmental impacts.
4.4. Addition of a cistern to collect rain water for use in the stadium plumbing system.
4.5. Canopy structure to guard spectators from the elements.
4.6. Wind and solar generation.
At the top of the ski jump, a public observation deck is provided for people to get an interesting perspective of the city and the surrounding area. The highest point in the city right now is at the top of the GM Renaissance Center. At the top of that building there is a high-end restaurant that offers 360-degree views of the city. It was the effort of this project to create a similar opportunity to people, but with a very casual feel. This observation area offers indoor and outdoor views of the stadium and the city, and it is an interesting perspective of the region.

The main component of this thesis proposal is how a modern stadium can be used as a community amenity daily, instead of only when there is an athletic event. The public plaza that will accompany the stadium bowl and programmatic elements will be unique to any other known stadium experience. The public plaza penetrates the stadium and breaks up the static experience inside. When there are no events going on within the stadium, it is the intention for the plaza area to be a major draw for the community, offering a safe, family-friendly place for people to visit. The building that fills the site will have a variety of programs including working spaces, living spaces, retail, restaurants, and public space. It is the interactions of these spaces to the competition zone that will create interesting juxtapositions. The playing surface acts as a public space when there is not a competition happening, that the people that work at the office and people that live in the apartments can use. The competition space becomes an amenity for people that live and work, as well as, the community as a whole.

Ski jumping is a very unique sport and requires unique architecture for a successful competition. The jump structure is enormous and can be a majestic structural feat. It was intended to use the architecture of the ski jump to act as a beacon for the city of Detroit and be a source of pride in the skyline of the city. This goal can be achieved with architectural form, material usage, lighting, structure, and activity. The jump itself fulfills the requirements by the FIS for competition standards. A new trend in ski jumps that are being constructed recently is the use of a permanent wind screen, to protect the jumpers from gusting winds. This screen is a great opportunity to make formal moves with the architecture and incorporate visual technology, such as LED.

The stadium includes normal suites that have private food options, seating areas, and excellent views of the action. In addition there are special kinds of suites that will be unique from all of the others. They contain a larger capacity and have a private viewing balcony that have a connection to the public plaza, for a unique experience. When there are not events going on within the stadium, these suites can be rented to outside entities for conferences and meetings.

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The architect has great power in the case of a stadium to change the way that people watch sports and the way that they interact with the action. If the correct decisions are made, then the stadium will once again become a destination powerful enough to get people off of their couch and away from the high definition television.

The most important and most challenging portion of this project was the development of the hill that the ski jumping will be completed on. Since the site does not have the topography to support the event, the site was built up to create the performance hill. To make this portion of the project architectural, program spaces were integrated into the hill. This makes an interesting combination of earthworks and built form for the final project. A majority of the built hill will contain the vehicular parking garage. This was a good way to camouflage the parking structure and add structure and organization to the hill.

The site is urban, so it was a challenge to work out sufficient transportation and circulation pathways. It was the desire to tie into the currently proposed light rail system that is being installed in the city of Detroit. It was important to offer a form of public transportation to the stadium in order to give people an option other than driving.

As previously stated, it is the intention of this project to blur the line between the rigid grandstand portion of the stadium, the plaza space, and the spaces of working, living, and playing. This would have a positive impact on fan experience and would create individual nuanced interactions with other spectators and athletes.


