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I. Introduction

The designers of the past sought out the sites where the land would be easy to reclaim without too much hassle of what can and can't be accomplished in their designs. Therefore I am seeking to go against the Landscape Architecture normality rules for these landfills. Areas where people live below the poverty line are being targeted in trending locations to build landfills. In some cases the landfills are being built in close proximity to community members homes.

The site utilized in this research endeavor Arrowhead landfill in Uniontown Alabama is one of the severe cases of homes being in close proximity from a landfill which are 200ft away from the coal ash landfill. One of the goals of the researcher was to discover the process it takes to create a social experience on landfills in social injustice areas in Alabama's blackbelt region. He also plans to expose the interworkings of how landfill works to the public. Providing a new experience where the landfills and people can be apart of each other rather than seen as two separate entities is a main ideal guiding this research project. This new design approach gives people a chance to interact with the landfills' inner systems and allow them to have ways to monitor it. This thesis will explore what is in the landfill and how can it be used in favor of the nearby community by testing design ideas while the landfill is still operational. This will allow the community to be reassured of their safety by a manipulation of something that is considered private by law into a public space.

Throughout this book the discussion of environmental injustice will be discussed and the response to that through the design. Also how land fill anatomy works and how it is interwoven with social engagement. The landfill operations are a very complex and is a full system to contain and safely manage our waste. Landfills began as just dumps which is an area where waste is just sitting on the ground and not safely managed like a modern landfill.

“Yesterday’s dump was a pit or hill on the outskirts of town that played host to disease-carrying rodents, insects, and dangerous objects. Before the advent of modern landfills, Americans also burned their garbage. Due to environmental safety concerns, most municipalities have banned unregulated garbage dumps and burning due to the contamination of groundwater supplies, streams, and airways. Landfills are now the only sanctioned garbage disposal sites for most municipalities, and only qualified personnel are allowed to bury or burn waste. Most people see the end of household garbage when they leave it on the curb side for the garbage haulers. When garbage is taken away, it is routed to the landfill where it becomes part of the unending cycle of waste disposal.(enlightme.com)

In the 1940s and 50’s open dumps were becoming more popular due to the growth of the U.S. Hickman Jr. states, “An example of a landfill of the late 1940s was described in a report prepared by the Sanitary Engineering Research Project of the University of California in 1952.¹ The landfill studied in 1949 was described as follows: “Refuse was dropped and spread out over a large area to allow scavengers easy access. At the end of the day pigs were allowed on the spread-out refuse for overnight feeding. The next day the pigs were herded off and the refuse was pushed to the edge of the fill for burning.”

The reasons for changing this practice are obvious. Open burning of refuse created air pollution. Allowing pigs to eat raw garbage was not a sanitary practice. If open burning was not practiced to conserve space, compaction would be needed, but how much?

Early studies indicated that dumping in surface water and groundwater was not a good idea. The open dump was weather-friendly, but could a sanitary landfill be as well? Early work by the United States Army and by solid waste pioneers indicated that soil cover was a good idea, but how much and how often? There was no established guidance or frame of reference to set minimum requirements for what constituted a sanitary landfill. Clearly, if the open dump was to be replaced by a far more complex but safer method of disposal, the field would need to separate good practices from unacceptable practices to ensure that a sanitary landfill did indeed dispose of refuse in a sanitary manner.” Now we see the dangers of how dangerous they are to the environment and our waste must be treated with care and strategically placed. In a lot of cases landfills are not strategically placed but misplaced.

Landfills are misplaced in our rural low income communities. According to NY times, “According to those involved with the environmental equity program of the State Department of Environmental Protection, which announced its policy in 1993: “No segment of the population should bear a disproportionate share of the risks or consequences of environmental pollution or be denied access to environmental benefits, such as parks and forests, fishing and outdoor recreation.” This rule was put in place but has not been followed. Now the discussion comes of who has been discussing this and how have landfills been wrongfully placed in these zones pinpointed with minority groups.

In an article by Barajas he discusses some examples of the trending landfills in minority areas. “Sociologist Robert Bullard helped popularize the concept of “environmental racism,” the practice of clustering landfills, hazardous waste dumps, and heavy industrial polluters in poverty-stricken neighborhoods, often those of color, when in 1979 he helped spearhead a class-action discrimination lawsuit against a Houston-area solid waste company. African-American communities hosted six of the city’s eight solid waste landfills, even though African Americans only comprised 28 percent of the city’s population. Further studies in the ‘80s and ‘90s painted a bleak picture: industrial polluters overwhelmingly opted to set up shop near poor neighborhoods — areas where residents don’t have the means to pack up and move when the air or water grows tainted. A much-cited 2005 Associated Press investigation revealed that blacks were 79 percent more likely than whites to live in neighborhoods with industrial pollution, while Hispanics were twice as likely as non-Hispanics to live in such “sacrifice zones.” Another example of environmental injustice is in Warren County, N.C., officials approved burying 32,000 cubic yards of soil contaminated with toxic polychlorinated biphenyls (PCBs) in a predominantly black community. In Corpus Christi, oil waste dumps, later converted into general hazardous waste sites, bookend two formerly race-zoned neighborhoods (city officials in 1940 reserved one of the neighborhoods for “Mexicans,” the other for “Negroes”). Residents in one predominantly black neighborhood in Pensacola, Fla., lived for decades sandwiched between an Agrico Chemical Company fertilizer plant, later dubbed “Mount Dioxin,” and a sprawling wood treatment facility, forced to live in a chemical bubble riddled with cancer-causers dioxin, polynuclear aromatic hydrocarbons (PAHs), and arsenic. Plant workers and residents showed elevated levels of dioxin in their blood even 25 years after the facilities shuttered.” Throughout the U.S. there is an unequal dispersment of waste in low income neighborhoods. Are people who make little to nothing in wages are more insignificant that the upper class ? It seems that way. Bullard states “Across the United States, poor and minority neighborhoods bear an unequal burden from hazardous facilities and waste sites. This pattern is evident nationally as well as on the state and local level.

Pollution is unequally distributed across the country; it is also distributed unequally within individual states, within counties, and within cities. Hazardous waste sites, municipal landfills, incinerators, and other hazardous facilities are disproportionately located in poor and minority neighborhoods. Furthermore the most landfills and toxic areas in the U.S. can be found in the Southern States. In fact there is a representation of 60 percent of total hazardous waste landfill capacity and are conveniently located in five southern states: Alabama, Louisiana, Oklahoma, South Carolina, and Texas. Fourteen Of these, three of the largest sites were located in primarily black zip codes, and these three “accounted for about 40 percent of the total estimated. It is time for a change and a new call to action to stop this injustice and a even greater opportunity to change a negative into a positive for people who have been disrespected.

There has been more recent discovery about this topic of waste being in social injustice areas. Race was by far the most prominent factor in the location of commercial hazardous-waste landfills, more prominent than household income and home values. More recent studies have found similar results. For example, a study of the distribution of hazardous sites and polluting facilities around Massachusetts found that communities of color and working-class communities are home to significantly more hazardous sites and facilities than wealthier communities and those with a small minority population. Low-income and minority populations are also more likely to live in areas where high lead exposure is likely, due either to soil contamination or to lead paint. These researchers looked at the distribution of hazardous waste sites, landfills and transfer stations, polluting industrial facilities, power plants, and incinerators; they also created a measure of exposure to cumulative environmental hazards, looking at all the exposure sources together. They found that “high-minority communities face a cumulative exposure rate to environmentally hazardous facilities and sites that is nearly nine times greater than that for low-minority communities.” Cumulative exposure in low-income communities is about three to four times higher than in other communities in Massachusetts. (Faber, Kreig 2002) There was also a study done by the same researchers who did Massachusetts in Los Angeles on air pollution and showed that kids in the minority groups suffered the most from the air pollution. This just displays that this is a trend in other parts of the U.S. as well but still is centered around minority groups. How can we as designers respond to such disregard to human lives. We must take it upon ourselves to realize that all lives matter and there must be a new way to design in these sites that takes these negatives and makes them educational to the public and get community involvement. Through this year there has been a response created through landscape architecture design to deal with the landfill in Perry County Alabama. This is a new addition to the discourse in the field of landscape architecture with landfills in social injustice areas.

Social engagement in social injustice areas is a big factor. It is our job as landscape architects to engage communities and all people into the landscape not create toxic wastelands that overtime create bad reputations and seen as a barrier in communities. Engaging the community in their landscape creates a sense of ownership and piece of mind knowing what the landscape is about and how it works and being able to engage with it. WE ACT for Environmental Justice (West Harlem Environmental Action, Inc.) is a non-profit, community-based, environmental justice organization dedicated to building community power to fight environmental racism and improve environmental health, protection and policy in communities of color. WE ACT accomplishes this mission through community organizing, education and training, advocacy and research, and public policy development.

As a result of our ongoing work to educate and mobilize our community the more than 630,000 residents of Northern Manhattan on environmental issues affecting their quality of life, WE ACT has become a leader in the nationwide movement for environmental justice, influencing the creation and implementation of federal, state and local policies affecting the environment. The WE ACT organization is a key precedent of understanding how

people have come together in order to engage these areas that plague their community. They even come together over smaller issues for example how their community. These member organizations agreed to a set of principles of collaboration and the goal of organizing diverse community stakeholders to advocate for environmental justice, sustainable community planning, and wise health policies and practices.

Collaborative members currently participate in three key work groups: environmental health, climate justice, and food justice. “WE ACT” and workshop participants agreed that they needed to form a core group that would help to organize and educate their neighbors to take action around the issues they learned; thus was created the Healthy Homes Street Team. The

Street Team uses research, investigation, and peer-to-peer communication to build community capacity to address environmental health concerns.”(WEact.org) Designers can take from groups that gather community participation, and create ideas by putting it into their designs and using their methods to get more informative ideas for their implementations to solve problems, create involvement, and make it educational.

This thesis was an exploration through new design techniques than hone the understanding of how landfills operate while figuring out ways to engage with the community. The researcher explored ideas through understanding how previous social injustice community groups have engaged with their people and found existing resources to use to help solve issues. There will be a creation of a new social engagement through interaction with landfill systems and a new gift to the field of landscape architecture field of how they can begin to design in these types of low income area.

e researcher has always had a strong interest in parks since a child. He was always intrigued by them and the thought behind the creation of them. As a youth he wondered why parks were better than others? How can one park be not as nice as any other new park if they are all public? These are some questions that always resonated his mind, and is responsible as one of the driving forces to make the decision to study in the field of landscape architecture. Through this field of study one can encourage change and make a difference in peoples lives through designing new experiences that will forever be remembered.

Through the desire to design parks and create EXPERIENCES. The first half of the year began by just an idea of recreating some park that was in need of attention in the Alabama region. However, that idea was not interesting enough. There needed to be an exploration of unconventional factors in the landscape architecture discipline dealing with park design in a way to push my design in a different and new direction. Therefore the chosen site was to use landfills. The researcher was unable to use just a regular landfill with no detrimental factors because landscape architects have been using the most easily reclaimable landfills for years and landfills that do not provide much risk legally.

The search began for landfills in Alabama that were under investigation for being placed wrongfully into peoples communities. There are many landfills in Alabama to ultimately feel that Alabama is a dumping ground , and in many cases a dumping site for other states waste. One reason for our large amount of landfills is due to our cheap dumping prices. Also, despite the harm done to communities it is also seen as a great money maker for local governments.

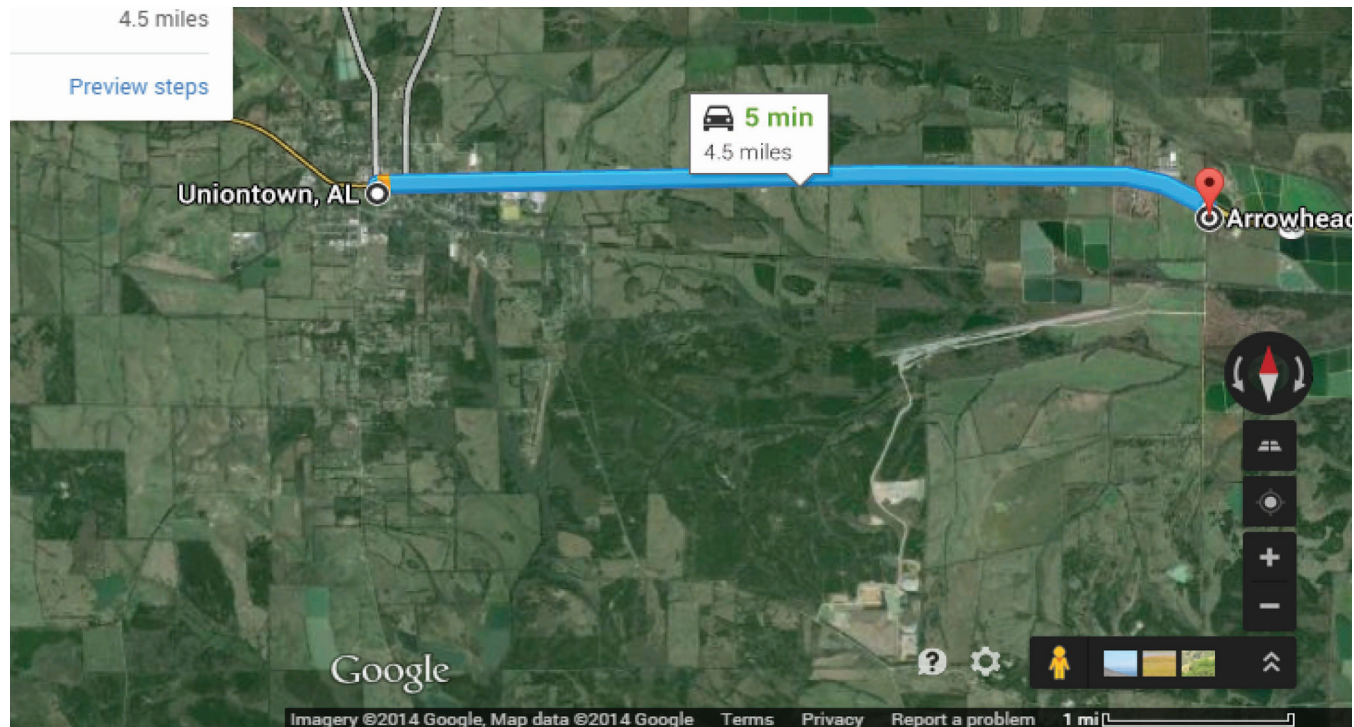
With all this in mind arrowhead landfill was found in the area that displayed the most injustice done to the community. Which is why that site was chosen for this research. Arrowhead landfill located in Perry county Al. The Researchers stance on the issue of how landfills should be distributed, is that it should be done fairly by ensuring everyone in the community has a vote on if the landfill is able to be placed in their neighborhood.

Barbara Evans, community organizing coordinator for a nonprofit environmental law firm, states “There are no measures in place for the local host governments to approve or disprove a change in the permit, or what materials are accepted in a landfill. That is an ADEM process, and only if there is some technical error in the permit application will ADEM deny a permit, or require a change in the permit.

My work with the Alabama Legislature has not been successful. The landfill lobbyists came out in droves. One committee chair, Rep. Bill Dukes of Decatur, refused to hold a committee meeting on the landfill bill because he knew we had the votes to get it out of committee.

Sponsors Rep. James Thomas of Dallas, Wilcox and Lowndes counties and Sen. Wendell Mitchell did not have the power to get the bill passed. We were simply outgunned by the powerful anti-environmental lobbyists and the corporations they represent. There are national headlines about how this coal ash is being sent to a

predominately black, low-income area in predominately black, low-income area in Alabama. People are understandably outraged. I find it sad, and telling, that two giants of the civil rights movement, Albert Turner Jr. and former SCLC President Charles Steele, are the original backers of the whole landfill effort in Perry County. This is not just a case of environmental racism. It is primarily a case of environmental injustice. The people most adversely affected are low-income people. Those who would dump this coal ash are the powerful. They are white and they are black. If Alabama allows this effort in Perry County, it will be another clear sign that Alabama is open for business the business of landfills. We have more landfills than we need in our beautiful state. We have more than enough to handle our own waste for decades to come. Our wimpy landfill laws and the huge profit margin of landfills are already encouraging landfill development in many of our rural counties. What is not well known is that the landfill developers were invited in to Perry County by political leaders. For the past three years I have worked with the Alabama Legislature to put some controls on landfills. Right now, if a landfill developer wants to put a landfill in a county it must gain approval of the county commission or local host government. However, if that host government fails to act on the request within 90 days, the landfill is automatically approved.” This is political leaders turning their backs on their community that they serve for financial gain. Alabama this must stop!



Demographics

Median income	
Per capita 13,433	
Black or African American	7,276 68.7%
American Indian and Alaska Native	17 0.2%
White	3,204 30.3%
Asian	30 0.3%
Asian Indian	13 0.1%
Chinese	7 0.1%
Filipino	6 0.1%
Vietnamese	1 0.0%
Other Asian	3 0.0%
Native Hawaiian and Other Pacific Islander	5 0.0%
Guamanian or Chamorro	3 0.0%
Other Pacific Islander	2 0.0%
Some Other Race	16 0.2%
Two or More Races	43 0.4%
White; American Indian and Alaska Native	2 0.0%
White; Asian	1 0.0%
White; Black or African American	19 0.2%
White; Some Other Race	3 0.0%

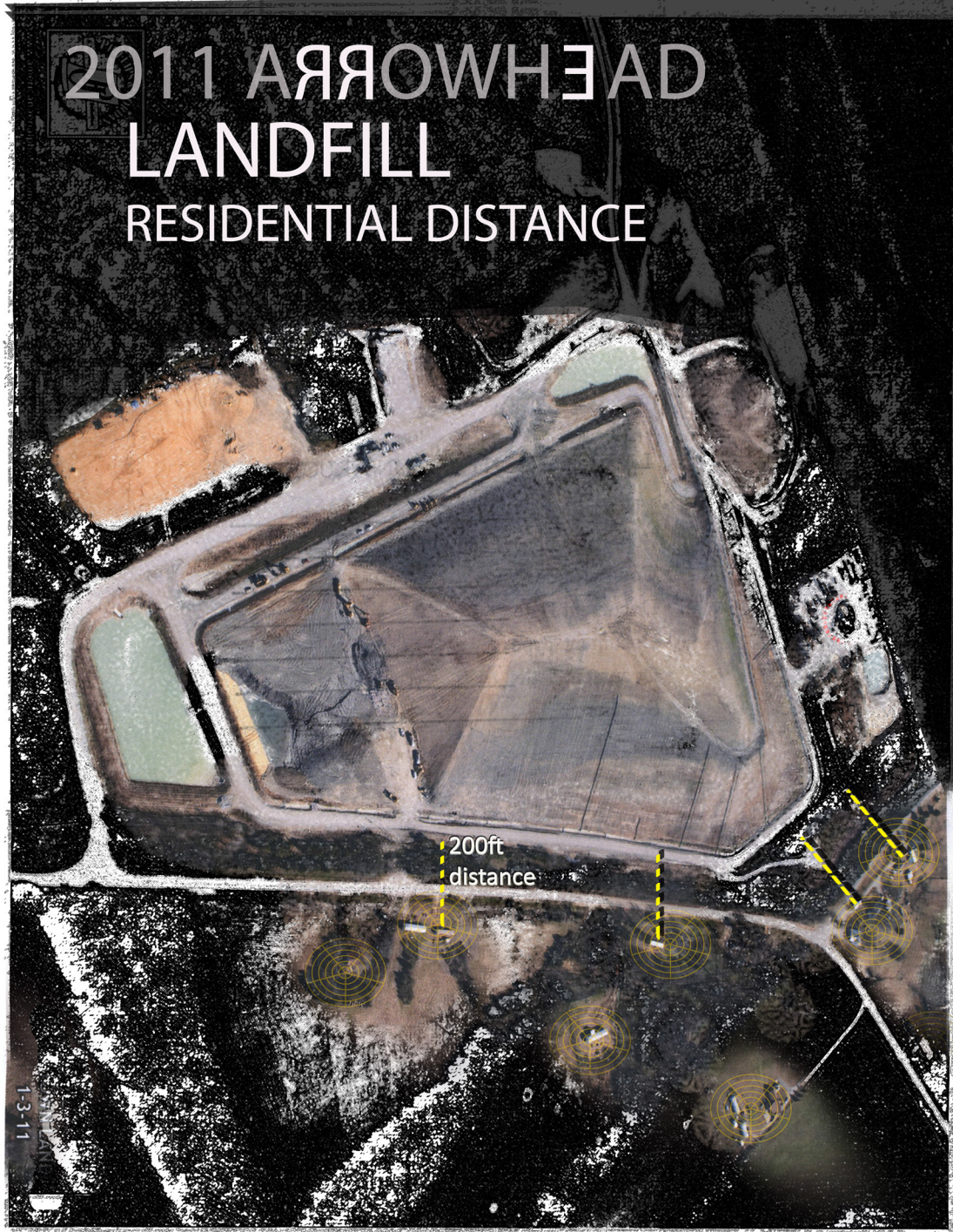
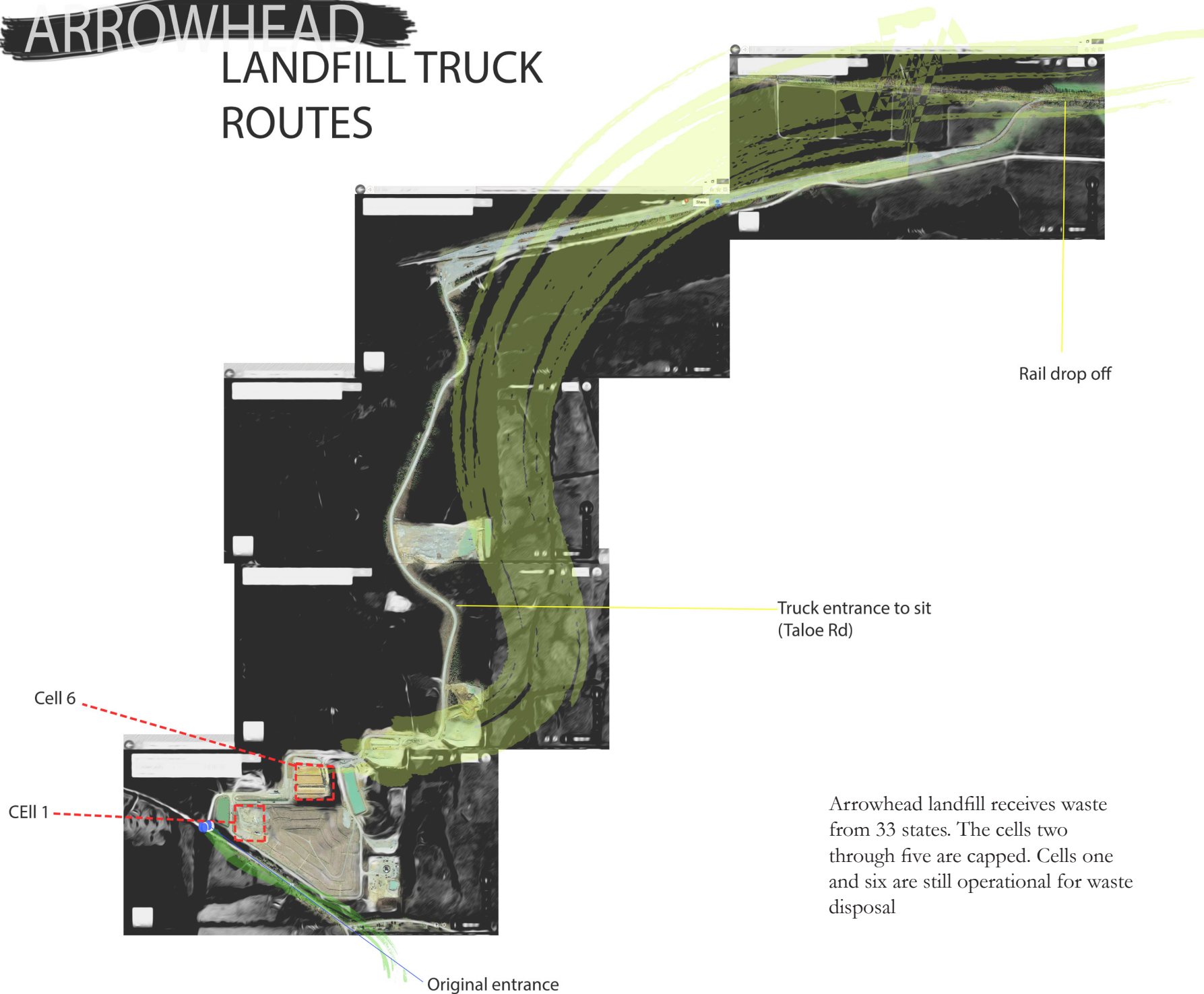


Image on the left displays how close the homes are to the landfill which began in 2009. The image at the top right shows the demographics and the population of Perry County is approximately 10,000 people.

ARROWHEAD

LANDFILL TRUCK ROUTES



Rail drop off

Truck entrance to sit (Taloe Rd)

Cell 6

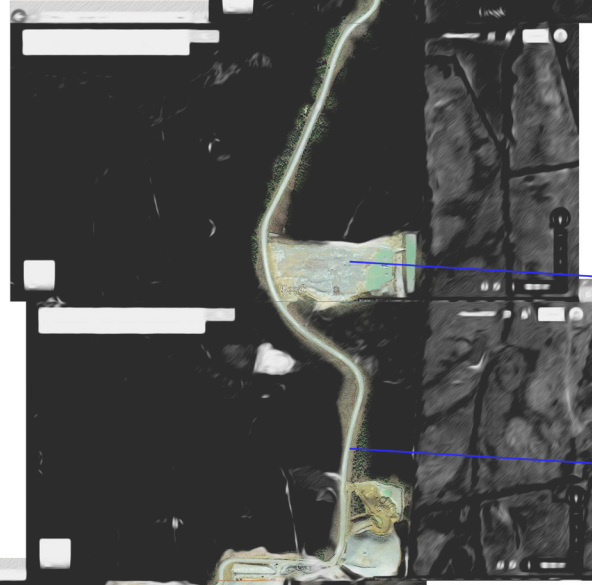
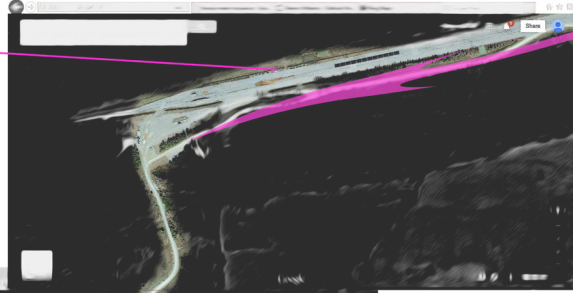
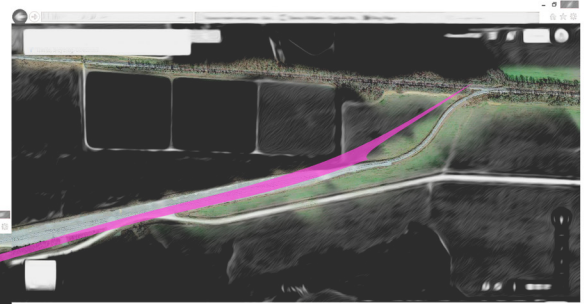
Cell 1

Original entrance

Arrowhead landfill receives waste from 33 states. The cells two through five are capped. Cells one and six are still operational for waste disposal

ARROWHEAD LANDFILL

Diverted Rail line

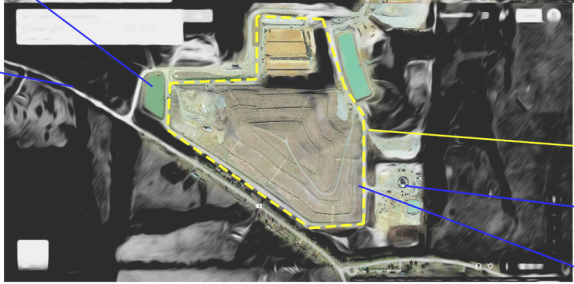


Mounds

Taloe Road

Sediment ponds

Cahaba Road



Landfill cells 1-6

Leachate tanks

Methane Flares

Basketball court
Tennis Court
Swings



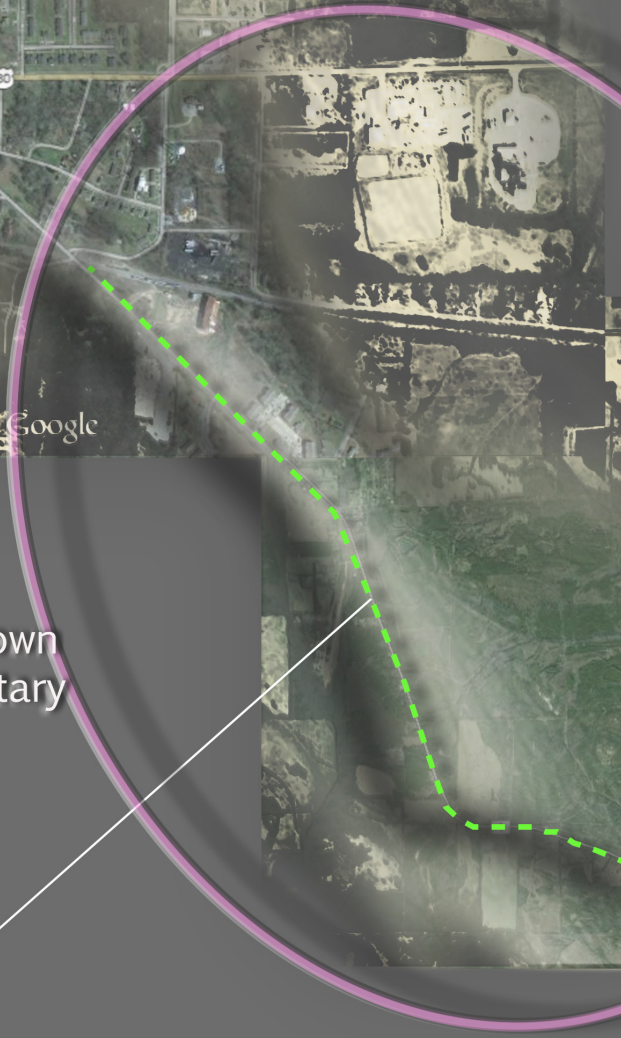
UNIONTOWN



Robert Hatch
High School

Uniontown
Elementary

Google



5 Miles to
Arrowhead Landfill

Arrowhead Landfill



In the nearest town to the Landfill it contains a elementary and a high school. Also the park that is in town is in much need of some maintenance.

The researcher looked at other landfill redesigns and what was missing that they were not exploring. The exploration revealed that previous designs such as Fresh Kills landfill only used approximately 40% for dumping. The designers of the past sought out the sites where the land would be easy to reclaim without too much hassle of what can and can not be accomplished in their designs. Therefore the goal is to go against the Landscape Architecture normality rules for these landfills. The idea is transgression or what the researcher has claimed to be “Transgressive design”. He has reviewed many different landfills and after careful investigation the choice is the coal ash landfill in Perry County Alabama. “The act of transgression allows for the co creation of ideas in a participatory and dialogical fashion.”(Michael L Rios and Peter Aeshcbacher)

The Researcher could wait years and years for this landfill to completely close but how does that benefit the community members during all of those years, months and hours of waiting for it to close and what makes my design any different from what they have done? Therefore the use of transgression will allow a co existence of the negative and the positive and as time passes the rules would become a lot stricter on the landfill. Also a possibility that it could make it close down even faster or convert its coal solely into something else or transport it to another place or re use the coal ash for something else re-purposing it and sending it out on the train. This is a manipulation of something that is considered private by law into a public space.

III. Site Investigation



Methodology/ Social injustice precedent

I want to change this negative into a positive and allow this intervention to be an example to similar areas going through the same issues. When will something be done about these landfills in Alabama? The Title VI of the Civil Rights Act of 1964 prohibits recipients of federal funds, which includes state agencies, from taking actions or implementing policies that have unjustified disproportionate effect on the basis of race. Since 2003 the residents have been battling the landfill. Where is the beauty in this situation, almost hard to find. How is this good for your eyes when in search for a positive aspect? “You have to keep changing your focus sometimes far, sometimes close...” How can I transform these completely used landfills into something positive that will create an experience that is the reciprocal of the pain they are experiencing today. The talks about Senegal in 2001 and how its recognized by UN standards to be destitute is one example. “Down the middle of this street, stepping over muddy puddles and goat shit, and around children and fish skeletons, two men dressed in beautiful embossed white gown talked as they walked...” (Sarah Nuttall) If the Coal ash is unhealthy for the community in Tennessee how is it any better for the people in Alabama. Now is the time to Change the focus.

Social injustice precedent

The 9 Harlem piers in New York was initiated by a organization called WE ACT. In 1998, WE ACT partnered with NYC Community Board 9 to organize the Harlem-on-the-River Project. Our goal was to engage community leaders and residents in developing a community-driven plan that would both increase access to the Harlem waterfront and raise interest in one of Northern Manhattan's neglected neighborhoods. Working with over 200 residents, elected officials, and representatives from the New York City Parks Department, a community vision plan for the waterfront was developed and submitted to the NYC Economic Development Corporation (EDC) by WE ACT in 1999. In late 2000, EDC scrapped its requests for proposals for commercial development at the site and developed a master plan based on the Harlem-on-the-River community plan. Approval for the final West Harlem Waterfront Park plan came in 2003 and applications for construction were quickly completed. A ground breaking took place in October 2005, and construction on the park was completed in late 2008. On May 30, 2009 the park was officially opened as the West Harlem Piers Park. (Weact.org)

Before:Harlem piers



After Harlem piers. (both images from WEact.org)



Fly ash

concrete
grout
cement
fill material for stabilization projects
road beds
43% USA portland cement

Bottom ash

Fill
snow control

Why is this good?

Create jobs in declining community
85% less energy than kiln firing
carbon footprint 191lbs
LEED certifications

Methane

burned for electricity
Heating
bio fuel
cooking

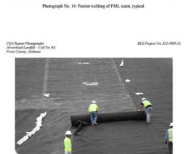
Investigation on what else can be
done with coal ash.

Scientific reason for choice of Site/ first social injustice landfill on record



The following is a claim from the arrowhead website. "Arrowhead is located over one of the most impermeable naturally occurring clay formations in North America. EPA specifications require that Subtitle D landfills are designed to adequately contain waste and provide a barrier between the groundwater through a sophisticated liner and leachate collection system. At our site, hundreds of feet of Selma Chalk provide an added bonus layer of protection between the lined Subtitle D facility and groundwater, making Arrowhead one of the most environmentally sound disposal facilities in the nation." Nevertheless arsenic was still found in the drinking water.

The first social injustice landfill to be recorded was 1979 lawsuit, *Bean v. Southwestern Waste Management, Inc.*, the first of its kind to challenge the location of a waste facility under civil rights law in Houston, Tx. The protesters were unsuccessful in keeping the landfill out nevertheless they put environmental racism on the map. Also decades later North Carolina was ordered to detoxify the landfill spending 25 million dollars.



Investigation of understanding how the layers beneath the coal ash work.

Industrial C&D Landfills



2 landfills Winston Al



2Plant Shelby



2 landfill calera shelby county



Inert Alexander cityTallapoosa



black Warrior Tuscaloosa



Carbon hill Walker al



City hartsville Morgan al



Fly ash Decatur al



Fines landfill Talladega al



Georgia pacific Landfill Talladega



Holt rd Tuscaloosa



Hyche landfill Winston al



Bloedel landfill Wilcox al



mead coated landfill Russel al



phifer wire landfill Tuscaloosa



Pine hill landfill Russel al



recycling waste management Tuscaloosa al



Sanders lead co. Pike al



Seaman Timber co Shelby



St.Clair landfill



Tamko asphalt products Tuscaloosa



Veneer Landfill Montgomery



Perry county



Sumter (emelle) al

Exploration of many different landfills in different conditions to decide on which site to choose for the thesis and these are some examples.

Municipal Landfills



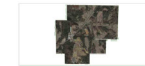
Baldwin county



Chilton county



Coffee county



Cullman



Eastern Jefferson al



Escambia county



Ft. Payne DeKalb al



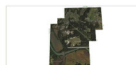
Houston al



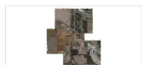
Huntsville madison al



Lauderdale al



Lawrence al



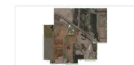
Limestone al



Marshall al



Mobile al



Morgan county



Mt.Olive Jefferson



North Montgomery al



Salem al lee county



Scottsboro jackson al



Shelby al



Stevenson jackson al



Turkey Creeek jefferson al



Walker al



MONITORING SYSTEM LEGEND	TOPOGRAPHIC LEGEND
<ul style="list-style-type: none"> MM-1 to MM-72 SURVEYED LOCATION OF METEORIC MONITORING POINTS (TRACT 1) MM-1 to MM-72 APPROXIMATE LOCATION OF SURFACE PUNCTURE METEORIC MONITORING POINTS (TRACT 1) MM-1 to MM-72 PROPOSED METEORIC MONITORING LOCATION (FUTURE PHASES) GWM-1 to GWM-17 SURVEYED LOCATION OF GROUNDWATER MONITORING WELLS (TRACT 1) GWM-1 to GWM-17 PROPOSED LOCATION OF GROUNDWATER MONITORING WELLS (FUTURE PHASES) SWM-1 to SWM-5 APPROXIMATE LOCATION OF SURFACE WATER SAMPLE POINTS (TRACT 1) SWM-1 to SWM-5 APPROXIMATE LOCATION OF SURFACE WATER SAMPLE POINTS (FUTURE PHASES) EXISTING SURVEYED LOCATION OF EXISTING PUMPERS 	<ul style="list-style-type: none"> TOPOGRAPHIC SURFACE ELEVATION IN FEET ABOVE WELLS (CONTOUR INTERVAL = 1 FEET) PROPERTY BOUNDARY CRACK OR TRENCH UNPAVED ROAD PAVED ROAD ELEVATION OF SURFACE CENTER (CONTOUR INTERVAL = 1.0 FEET) GROUNDWATER FLOW DIRECTION GROUNDWATER ELEVATION IN FEET ABOVE WELLS (CONTOUR INTERVAL = 0.5 FEET)



1"=250ft

123.4

CAHABA ROAD 80' R/W

TRACT

GWM-5
119.34

GWM-1
120.52

GWM-17
261.55

GWM-4
119.64

GWM-3
119.93

GWM-16
262.28

GWM-2
120.36

GWM-15
265.24

SWM-2

SWM-3

SWM-1

120.5

120.0

119.5

120.0

120.5

MM-10

MM-11

MM-12

MM-13

MM-9

MM-8

MM-7

MM-6

MM-5

MM-4

MM-3

MM-2

MM-1

MM-20

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MM-18

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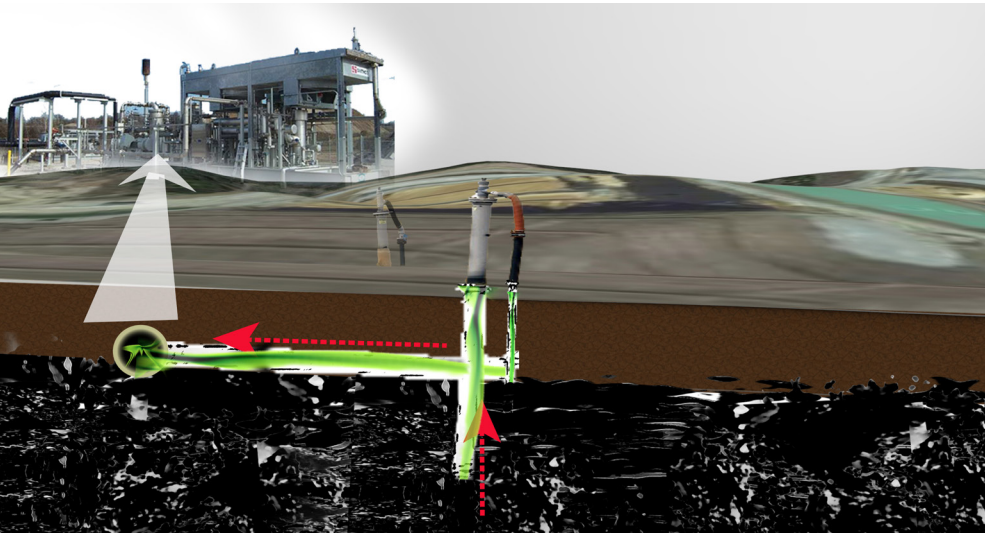
MM-2

MM-1

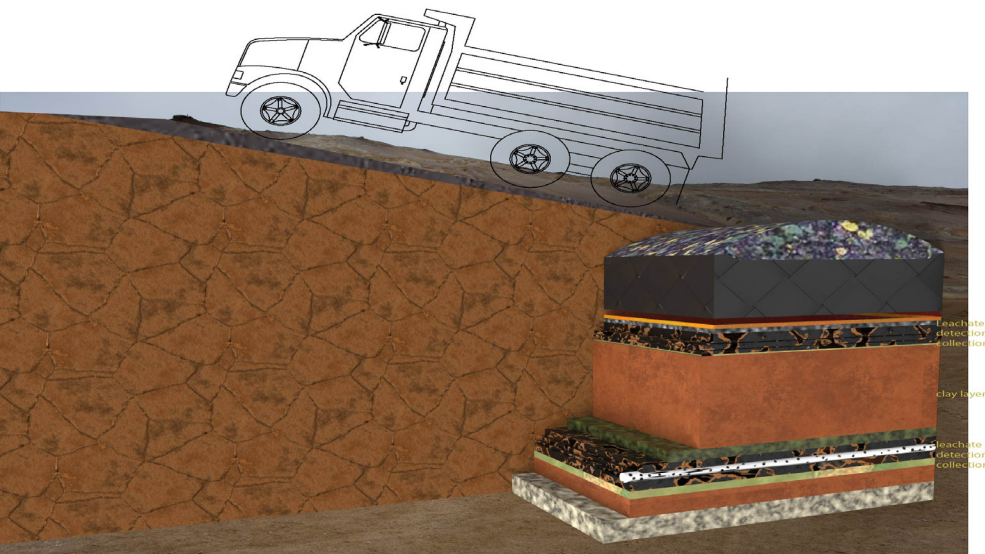
Cell Delineation Within the Landfill



Landfill is 425 acres contains two leachate tanks and thirteen methane wells. Cells one and six are still taking in waste while two through five are capped.

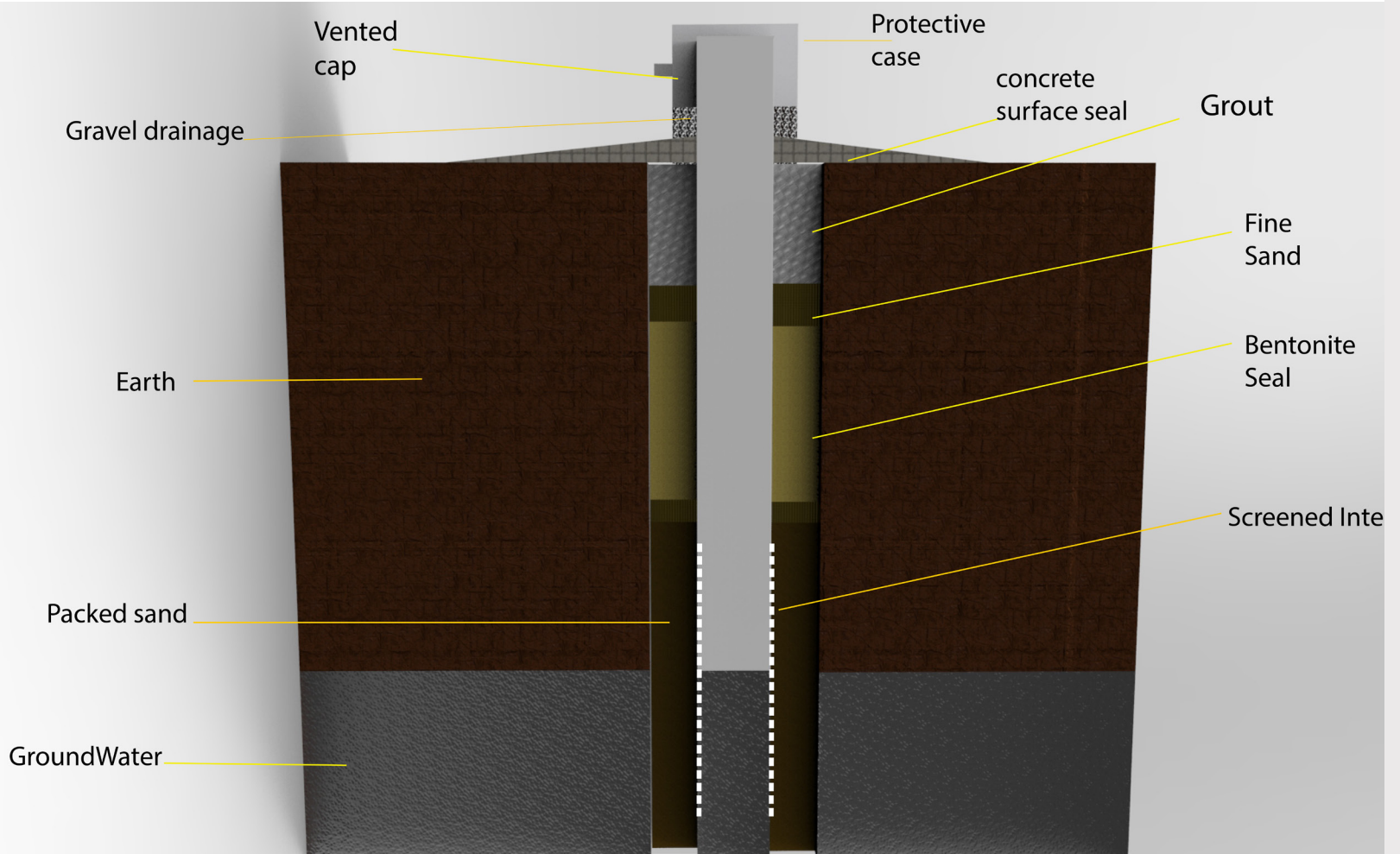


Redrawing methane monitoring system



Redrawing of typical landfill system

Ground Water monitoring Well Section



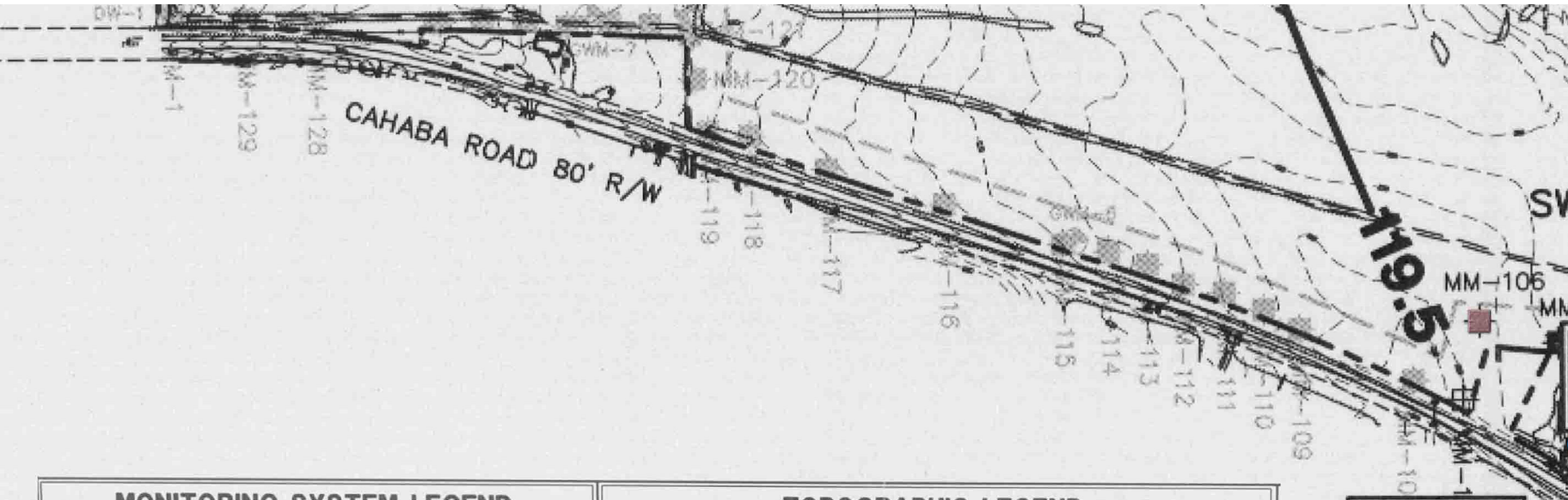
Clustered monitoring wells consist of individual monitoring wells situated close together, but not in the same borehole. The wells within a cluster are normally constructed to obtain water from different aquifers or water-bearing zones. Clustered wells are most often used for monitoring groundwater conditions at various depths in roughly the same area.

Individual monitoring wells consist of a single casing “string” within a borehole. Individual monitoring wells are installed in unique locations apart from one another. They are the most common type of monitoring well constructed in California.

A nested monitoring well can be difficult to construct because of multiple casings within the same borehole. Care is required during construction to ensure water-bearing zones for each casing string are hydraulically isolated from one another and the annular seals are effective. Some regulatory agencies may prohibit the use of nested monitoring wells for certain contamination or pollution investigations. Normally this can be due to uncertainties about whether water-bearing strata can be isolated and whether the annular seals in a nested well are always effective.

Proposed new idea for monitoring wells is a colored vapor illuminating glow which signifies everything is well within the landfill system. If the light is out contact and post through social media for immediate action.

2011 Zoom in plan of Landfill



MONITORING SYSTEM LEGEND

- MM-64 SURVEYED LOCATION OF METHANE MONITORING PROBE (TRACT 1)
- MM-60 APPROXIMATE LOCATION OF BARHOLE PUNCH METHANE MONITORING (TRACT 1)
- PROPOSED METHANE MONITORING LOCATION (FUTURE PHASES)
- GWM-1 SURVEYED LOCATION OF GROUNDWATER MONITORING WELL (TRACT 1)
- PROPOSED LOCATION OF GROUNDWATER MONITORING WELL (FUTURE PHASES)
- SWM-1 APPROXIMATE LOCATION OF SURFACE WATER SAMPLE (TRACT 1)
- APPROXIMATE LOCATION OF SURFACE WATER SAMPLE (FUTURE PHASES)
- SURVEYED LOCATION OF EXISTING PIEZOMETER

TOPOGRAPHIC LEGEND

- TOPOGRAPHIC SURFACE CONTOUR IN FEET ABOVE MSL
CONTOUR INTERVAL = 2 FEET.
- PROPERTY BOUNDARY
- STREAM OR CREEK
- UNIMPROVED ROAD
- PAVED ROAD
- 119.0** POTENTIOMETRIC ELEVATION CONTOUR
CONTOUR INTERVAL = 0.5 FOOT
- GROUNDWATER FLOW DIRECTION
- 121.50** GROUNDWATER ELEVATION (IN FEET ABOVE MSL)

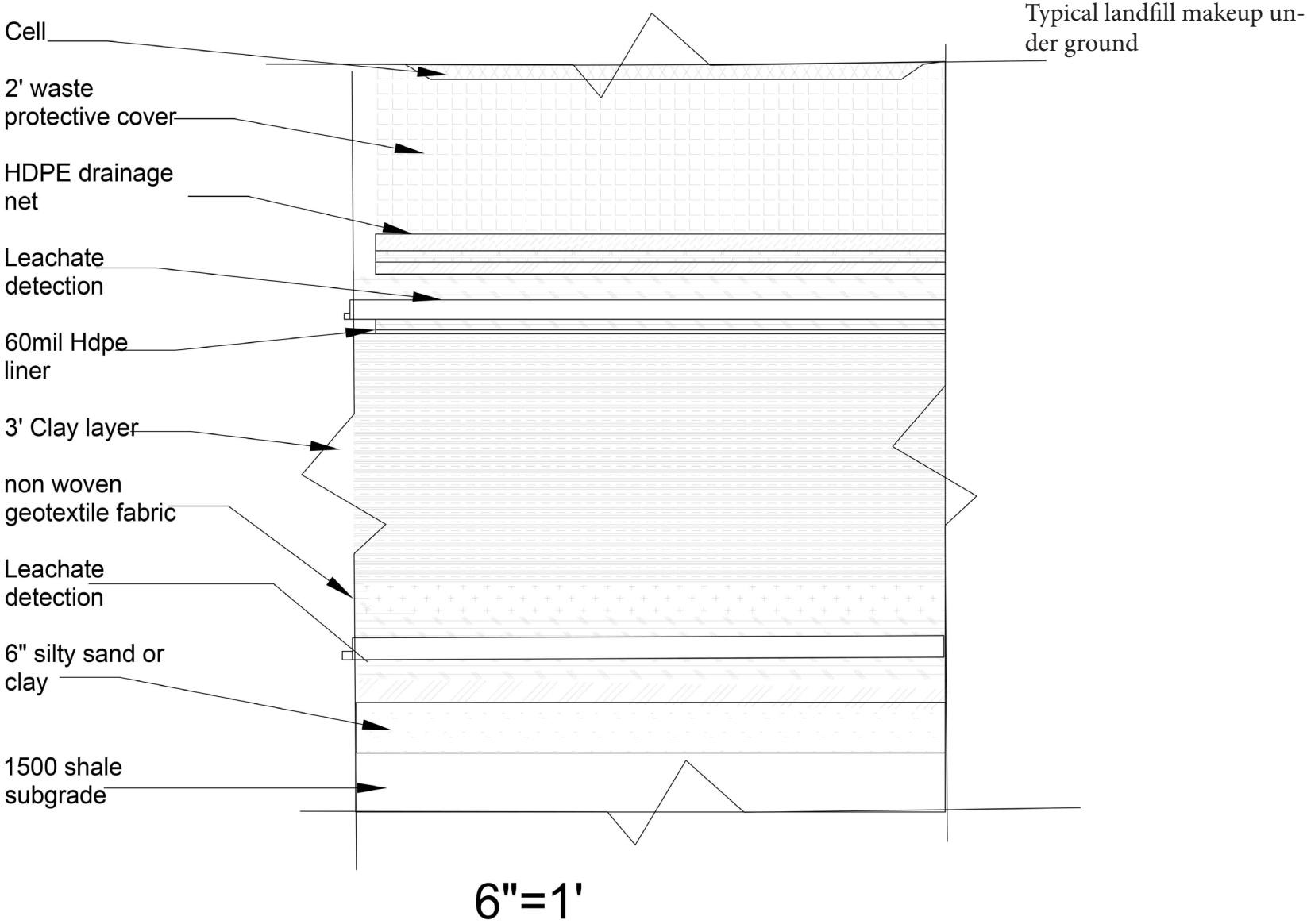
NOTES:
 MEAN SEA LEVEL ELEVATION (MSL) IS REFERENCED TO THE NATIONAL GEODETIC VERTICAL DATUM OF 1929 (NGVD).
 GWM-12, -13, -14, -15, -16, -17 AND -18 ARE SCREENED IN THE WEATHERED PORTION OF THE SELMA CHALK NEAR THE GROUND SURFACE AND ARE NOT USED FOR POTENTIOMETRIC SURFACE CONTOURING.



1"=250ft



Landfill Cap Exploration



ASPHALT Concrete CAP

Single Layer

Composition:

Concrete

Bituminous asphalt

Barrier between

landfill and environment



The design of landfill caps is site specific and depends on the intended functions of the system. Landfill Caps can range from a one-layer system of vegetated soil to a complex multi-layer system of soils and geosynthetics. In general, less complex systems are required in dry climates and more complex systems are required in wet climates. The material used in the construction of landfill caps include low-permeability and high-permeability soils and low-permeability geosynthetic products. The low-permeability materials divert water and prevent its passage into the waste. The high permeability materials carry water away that percolates into the cap. Other materials may be used to increase slope stability. The most critical components of a landfill cap are the barrier layer and the drainage layer. The barrier layer can be low-permeability soil (clay) and/or geosynthetic clay liners (GCLs). A flexible geomembrane liner is placed on top of the barrier layer. Geomembranes are usually supplied in large rolls and are available in several thickness (20 to 140 mil), widths (15 to 100 ft), and lengths (180 to 840 ft). The candidate list of polymers commonly used is lengthy, which includes polyvinyl chloride (PVC), polyethylenes of various densities, reinforced chlorosulfonated polyethylene (CSPE-R), polypropylene, ethylene interpolymer alloy (EIA), and many newcomers.

Soils used as barrier materials generally are clays that are compacted to a hydraulic conductivity no greater than 1×10^{-6} cm/sec. Compacted soil barriers are generally installed in 6-inch minimum lifts to achieve a thickness of 2 feet or more. A composite barrier uses both soil and a geomembrane, taking advantage of the properties of each. The geomembrane is essentially impermeable, but, if it develops a leak, the soil component prevents significant leakage into the underlying waste.” (frtr.gov)

CAP-D

Non Hazardous Waste

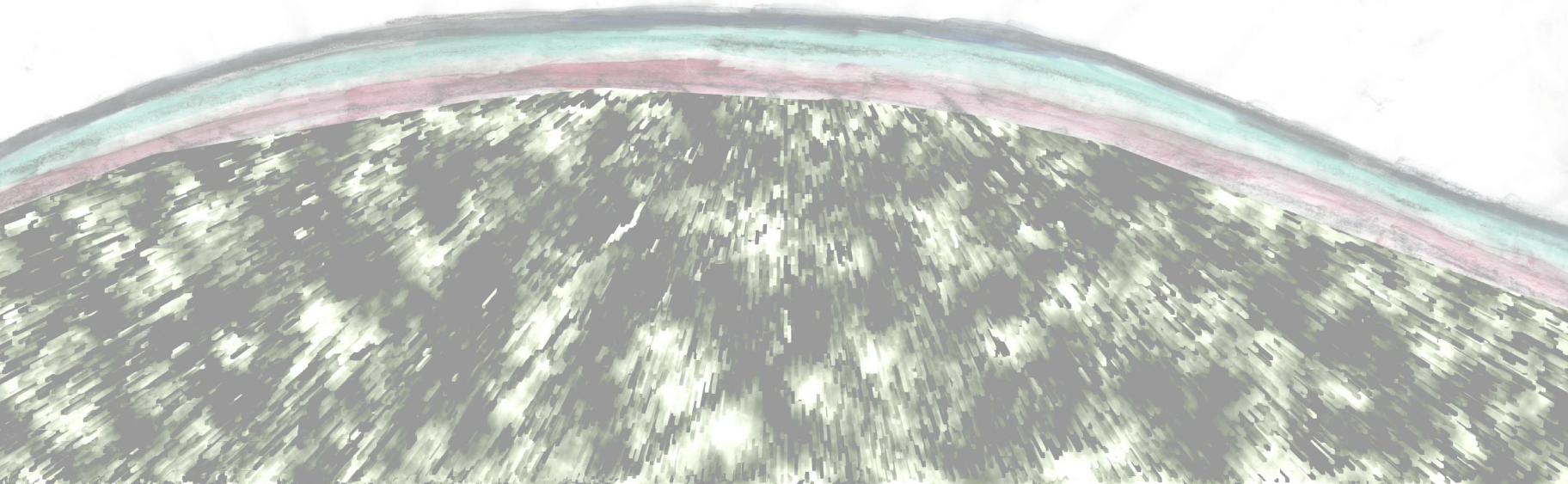
Generally from facilities at the bottom layer system

mean design specifications:

x material permeability approximately 1×10^{-5} cm of equivalent bottom liner system

+ infiltration layer must contain at least 45 cm of carbon material

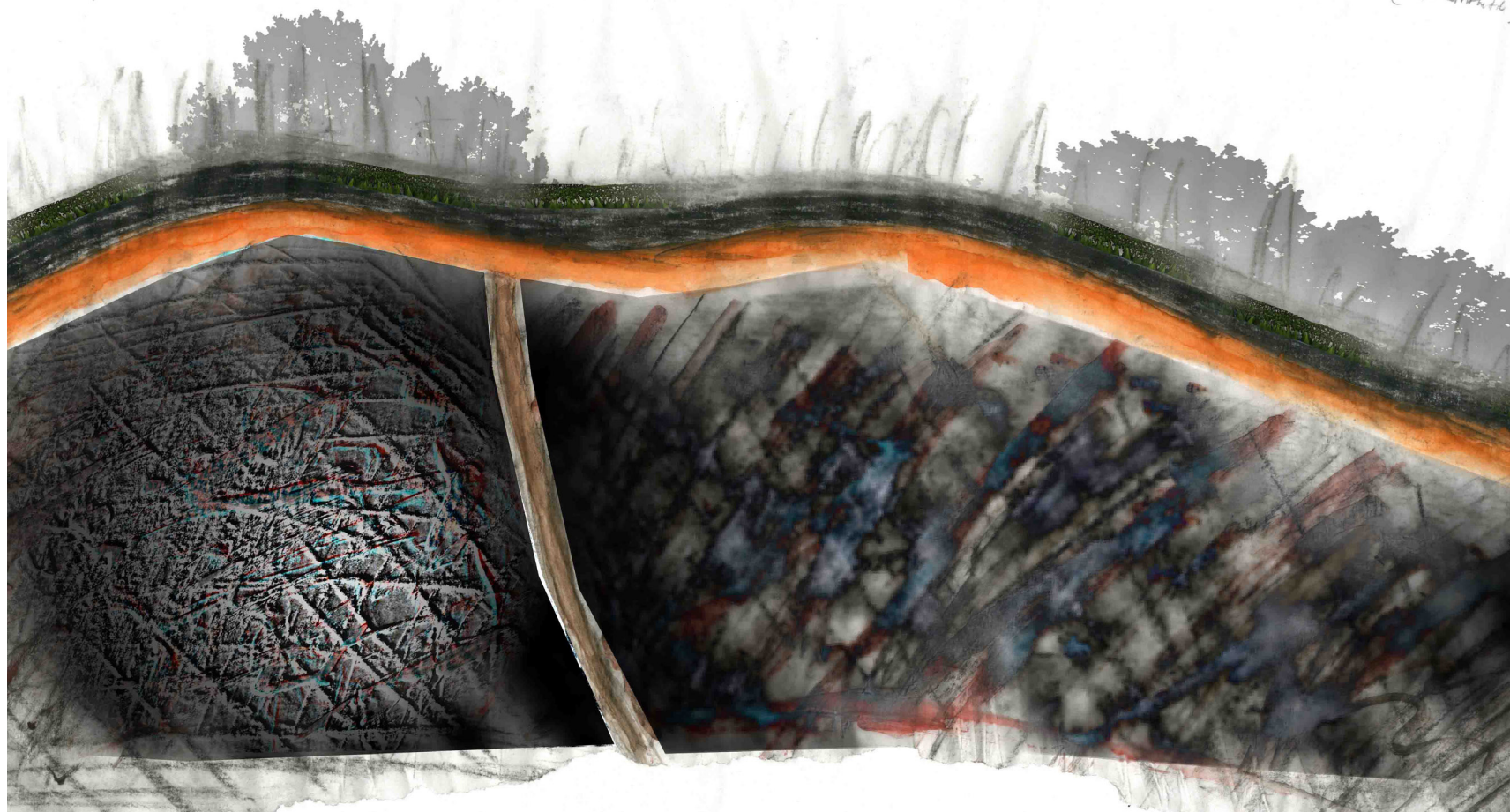
+ carbon control layer must be 15 cm of carbon material
capable of sustaining native plant growth.

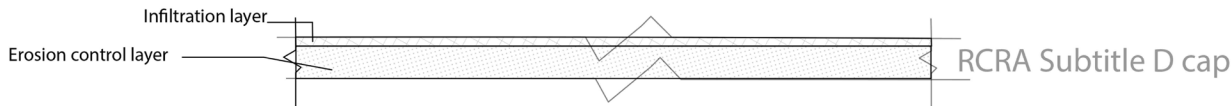
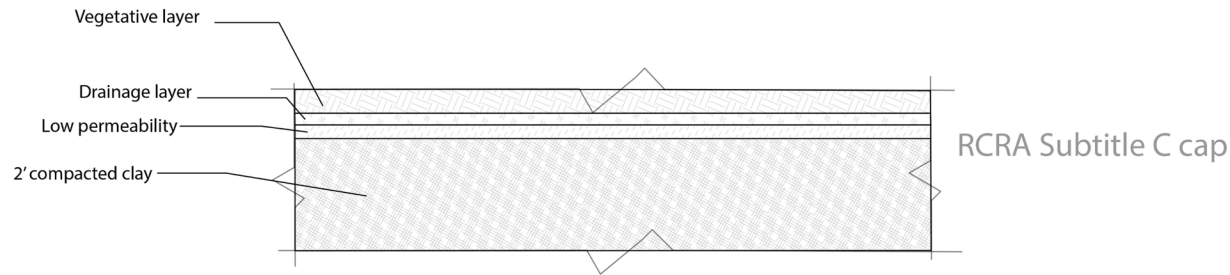


RCRA-C CAP

MULTILAYERED
USE: HAZARDOUS WASTE

1. Vegetative Layer
2. Drainage Layer
3. Low permeability layer (Clay or Synthetic)





Notes:

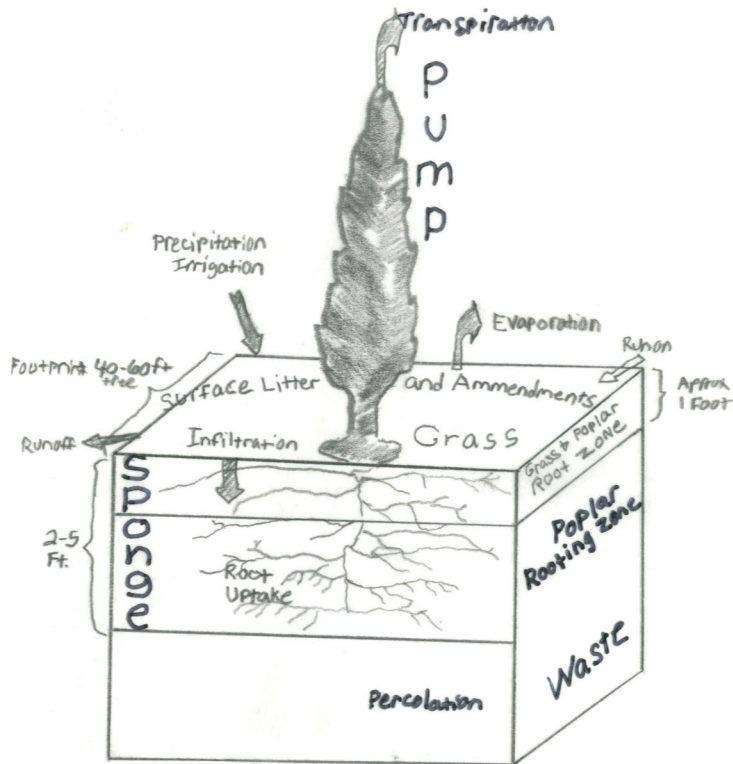
D Cap

- the material must have a permeability no greater than 1×10^{-5} cm/s, or equivalent permeability of any bottom liner or natural subsoils present, whichever is less.
- The infiltration layer must contain at least 45 cm of earthen material.
- The erosion control material must be at least 15 cm of earthen material capable of sustaining native plant growth. (frtr.gov)

Geomembrane

The most critical components of a landfill cap are the barrier layer and the drainage layer. The barrier layer can be low-permeability soil (clay) and/or geosynthetic clay liners (GCLs). A flexible geomembrane liner is placed on top of the barrier layer. Geomembranes are usually supplied in large rolls and are available in several thickness (20 to 140 mil), widths (15 to 100 ft), and lengths (180 to 840 ft). (frtr.gov)

Eco Cap



The ecocap main purpose is the water uptake to prevent less chance of water infiltration into the waste and in turn creating less stress on the leachate detection system.

IV. Strategy

Phase 2

PHASE 1 which is a testing site for the performance of different plants for erosion remediation and paths systems testing plants that can withstand foot traffic the best Also, how these landfills not only in Uniontown,Al but in different areas of small social injustice areas with landfills in Alabama will have testing sites play a role in the communities small colleges to expand there diversity in majors to study in and create a connection with larger universities through similar major programs where credits can be transferred to further their education in Sciences, Horticulture.

It would be a dialogue of the opportunities that are there now and how to capitalize on them.



Mel Chin Revival Field. Phase 1 precedent

The landfill would teach the community about its different operating systems by tours or self learning through information pamphlets provided by landfill office. The landfill will also remain operable and will be able to be even more closely monitored by the community through new lighted monitoring systems all labeled individually, and if any go out the name of that lighting system can be photo captured and posted on a social media websites and tagging it. The idea is to make this community and others aware of how landfills function and make people less frightened through incorporating systems in the recreative activities and in the phase 1 of scientific testing activities.

Hillock area discussion reference Mt.Trashmore
Nature preserve/passive design and reference Tift buffalo
Underpass
Trailsystem
Uphill track
Walking and running trails
Lighting system
Landfill shack
The methane grill section
Basketball courts and the availability of the park after dark

Marion Military Institute
Leadership
Criminal Justice
History
Pre-Engineering
Pre-Nursing
Natural Science
Psychology
Sociology
22min

Phase 1 nearby colleges
Majors
Distance from landfill

Selma University
associate, bachelors, Masters in art
Allied Health
30min

Judson College
Social Sciences Fine arts,
humanities/
24min

study trips to the Gulf Coast (Dauphin Island Sea Laboratory, Weeks Bay Nature Preserve, and Gulf Shores National Wildlife Refuge), and maintain the birding list for our local Park.

Concordia College
General Education, Teacher education
information systems, criminal justice
33min

Goals for site

Allowing public interaction to landfill systems

Landfill is still operational

Create new learning majors in the local areas

Interactive detection systems with the community

Working with landfills in low income communities

Site Specifics:

nearest mobile homes within 200ft

425 acres

5mi from Uniontown A1

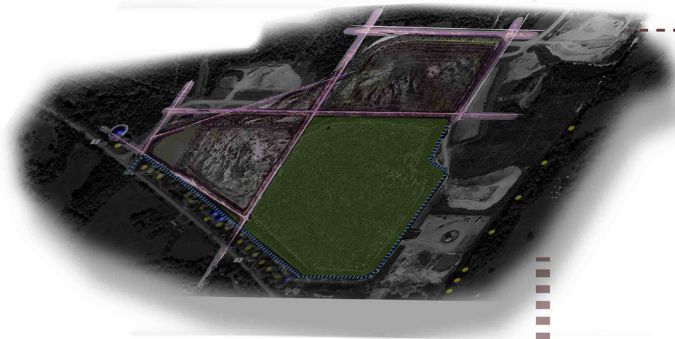
13 methane wells on the landfill

75 million cubic yards of air space 68 million remain

4 million tons of coal ash

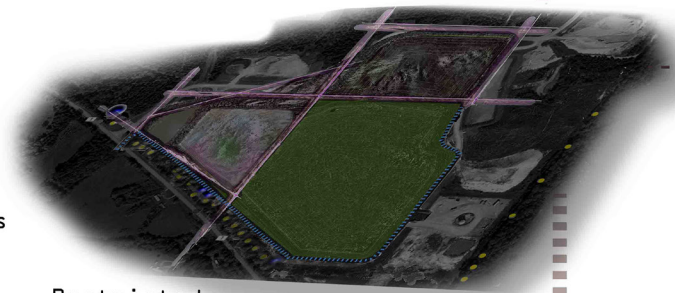
serves 33 States

15,000 ton waste receiving limit per day



2015

Cells 1 and B open (private)
Pink-NO PUBLIC ACCESS
Blue-public access route
Green-public private testing site



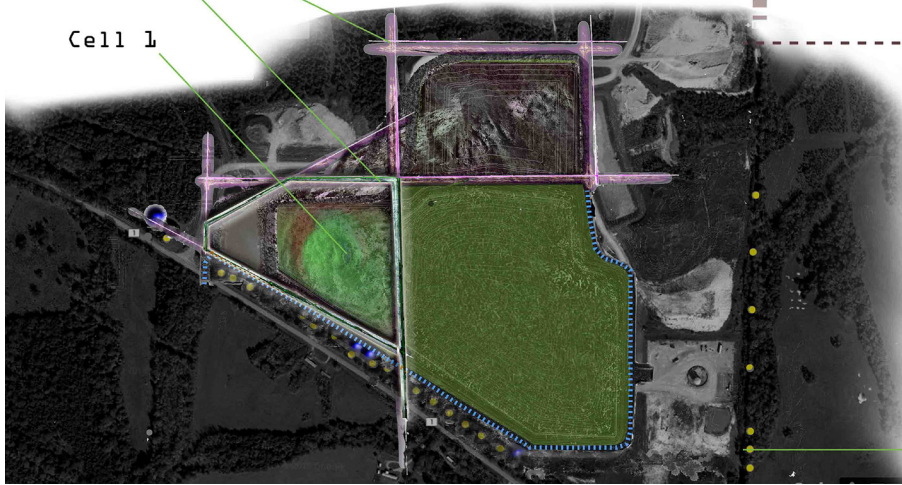
2020

Cell 1 closed B open
Cell 1 capped private
Cell 1 prepped for remediation testing

Open access boundary

Restricted boundary

Cell 1

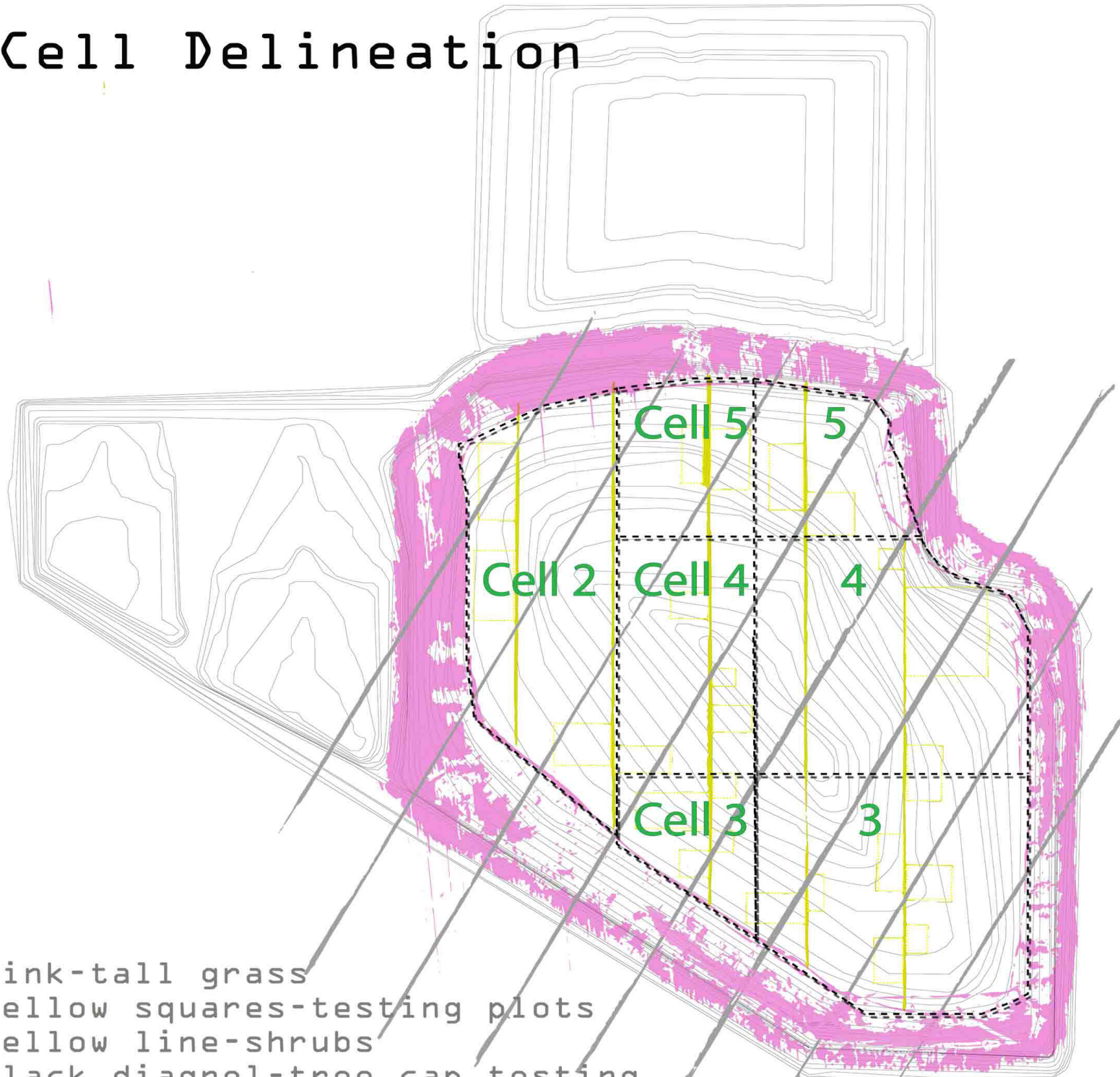


2025

Cell 1 closed
public access only
under supervision
Cell B open (private)

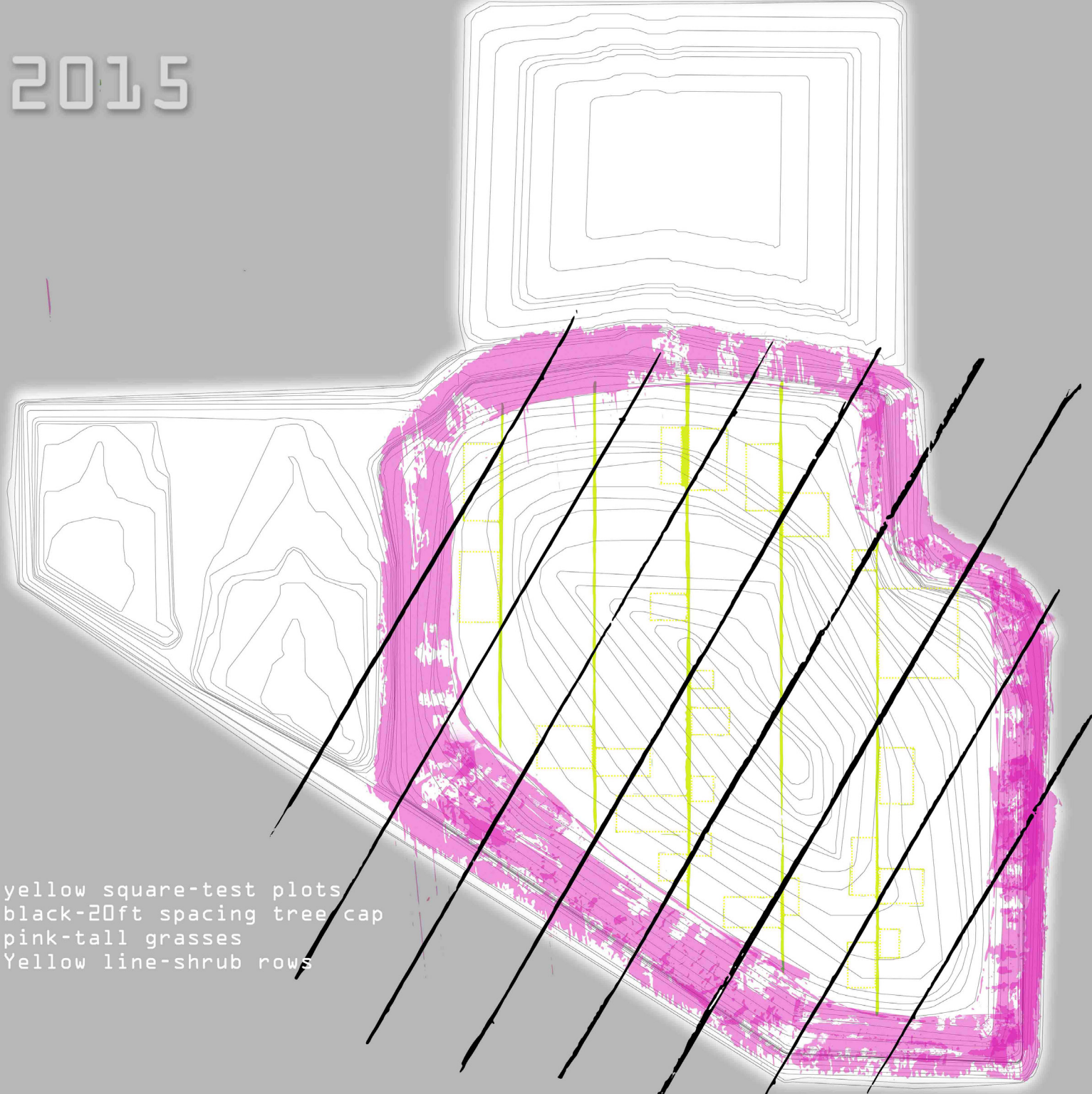
methane monitoring wells

Cell Delineation



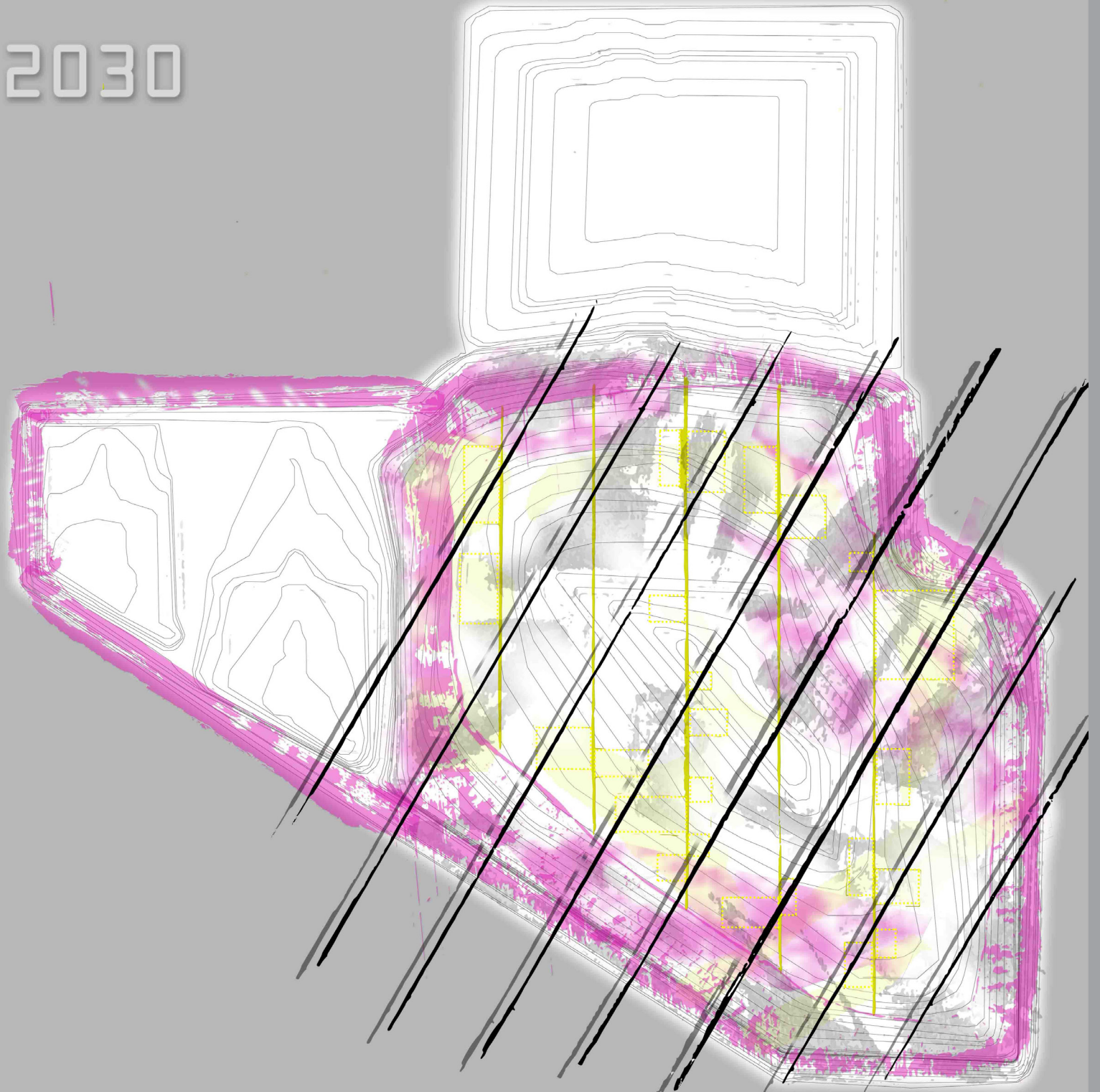
Pink-tall grass
Yellow squares-testing plots
Yellow line-shrubs
Black diagonal-tree cap testing

2015

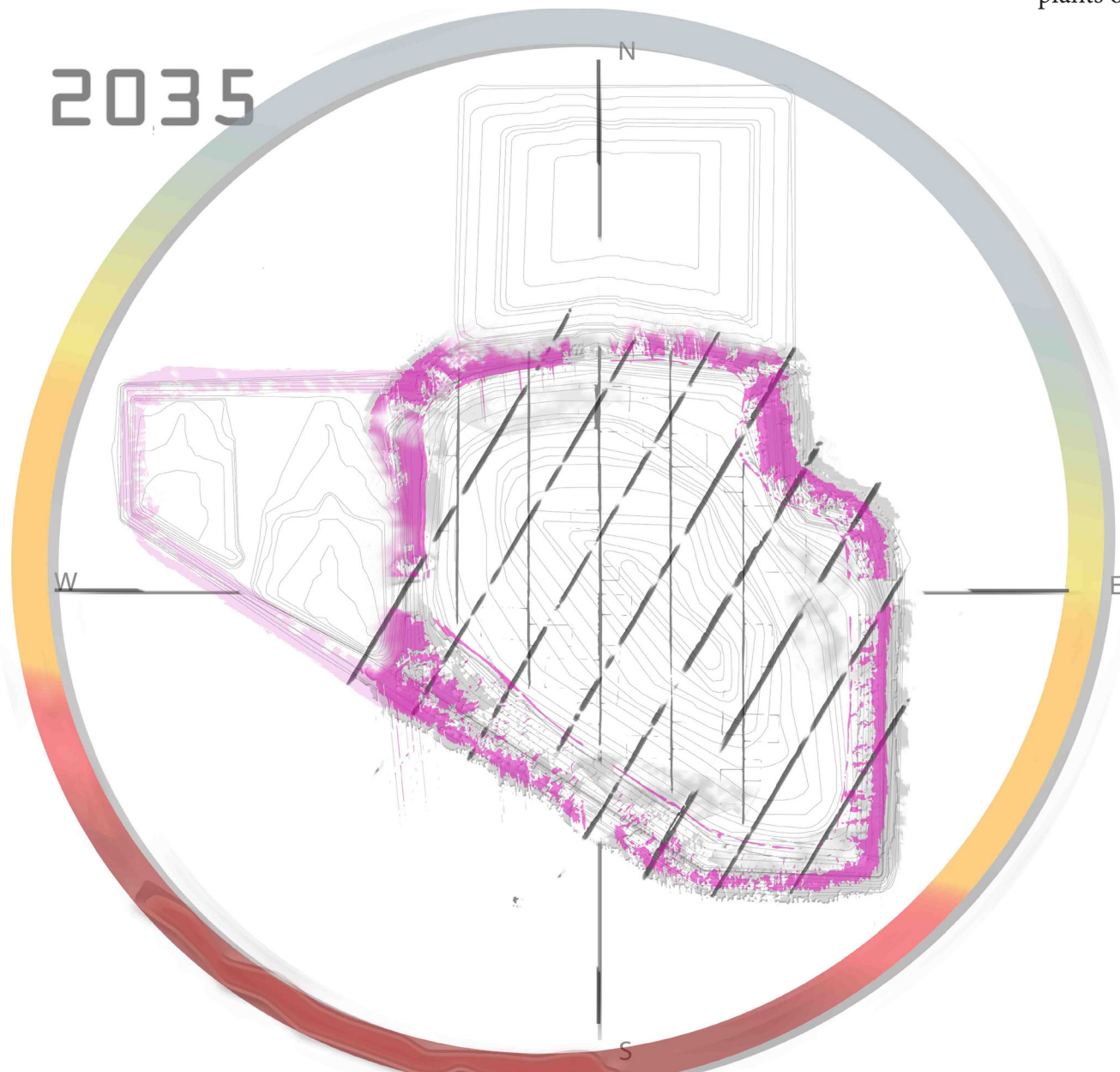


yellow square-test plots
black-20ft spacing tree cap
pink-tall grasses
Yellow line-shrub rows

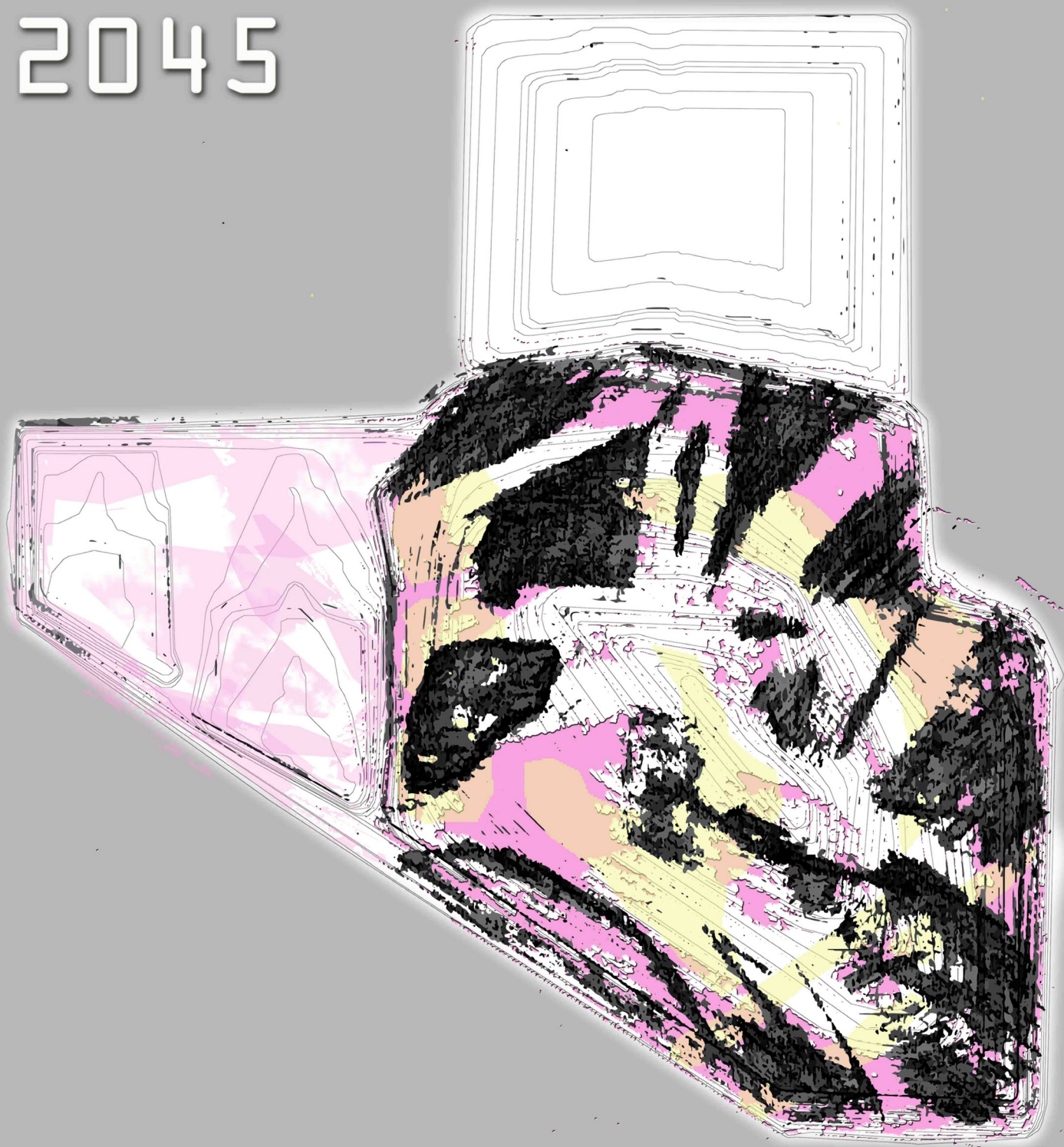
2030



Sun Shade Diagram:
Understanding what has
the best chance of living
and dying within the
plants on the site.



2045



Change in Approach to project

The approach began in the first semester as simply designing a park and finding precedents of other redesigned landfills. Although the completion of the park was revealed the question came about of how does it get to this point of being a park and what kind of people are here. Also how will people even know its here ?

These new thoughts arrived and made the design break up into two phases instead of one.

1st phase

Creating popularity through time by allowing local colleges to have majors that are new and deal with horticulture and agriculture engineering and testing site of how plants handle erosion, tree capping, and plant remediation.

2nd phase

Park that engages the community in a new way with its systems for monitoring interwoven in passive and active activities.

PLAN DRAWING SEQUENCE 1-6 AND EXPLANATION

The tree planting and response design is to ensure shade and sunlight at various points throughout the landscape to allow the scientist to plant testing plots accordingly

2015- First row of tree cap testing is implemented

2020-The first row of tree capping is grown and first trail implemented/ opening of cell one to the public

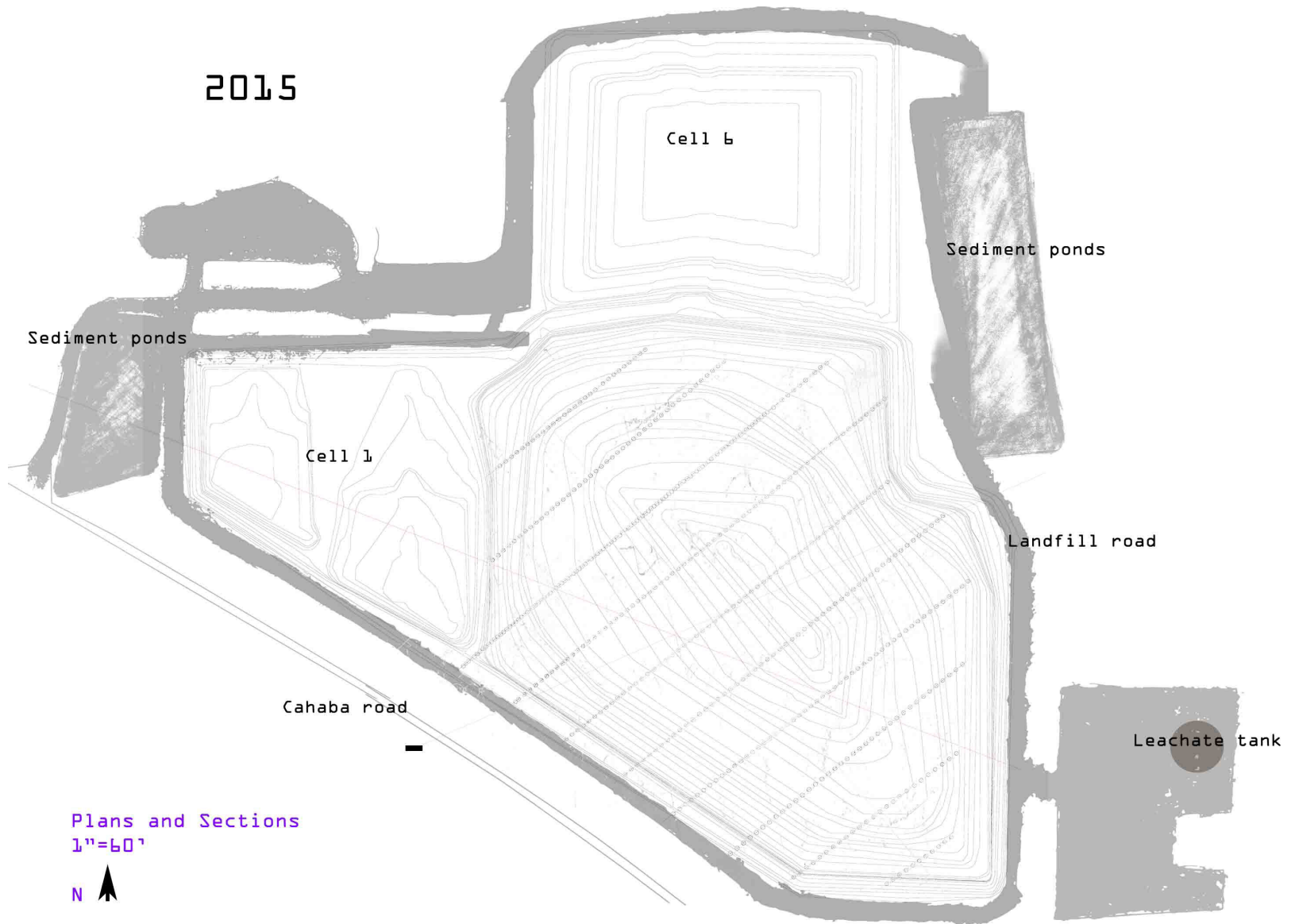
2025- The new methane monitoring wells are placed in

2035-The responses of the design in this phase is the tree replacement. This is where all new trees are planted in the gaps of the dead plants and connect in the opposite row of trees nearest gap or living tree ,whichever is closest

2036-Three rows of horizontal trees are planted

2045-Full grown plantings and landscape transfer over to a park design in the next 5 years

2015



Cell 2

Sediment ponds

Sediment ponds

Cell 1

Landfill road

Cahaba road

Leachate tank

Plans and Sections
1"=60'



2020

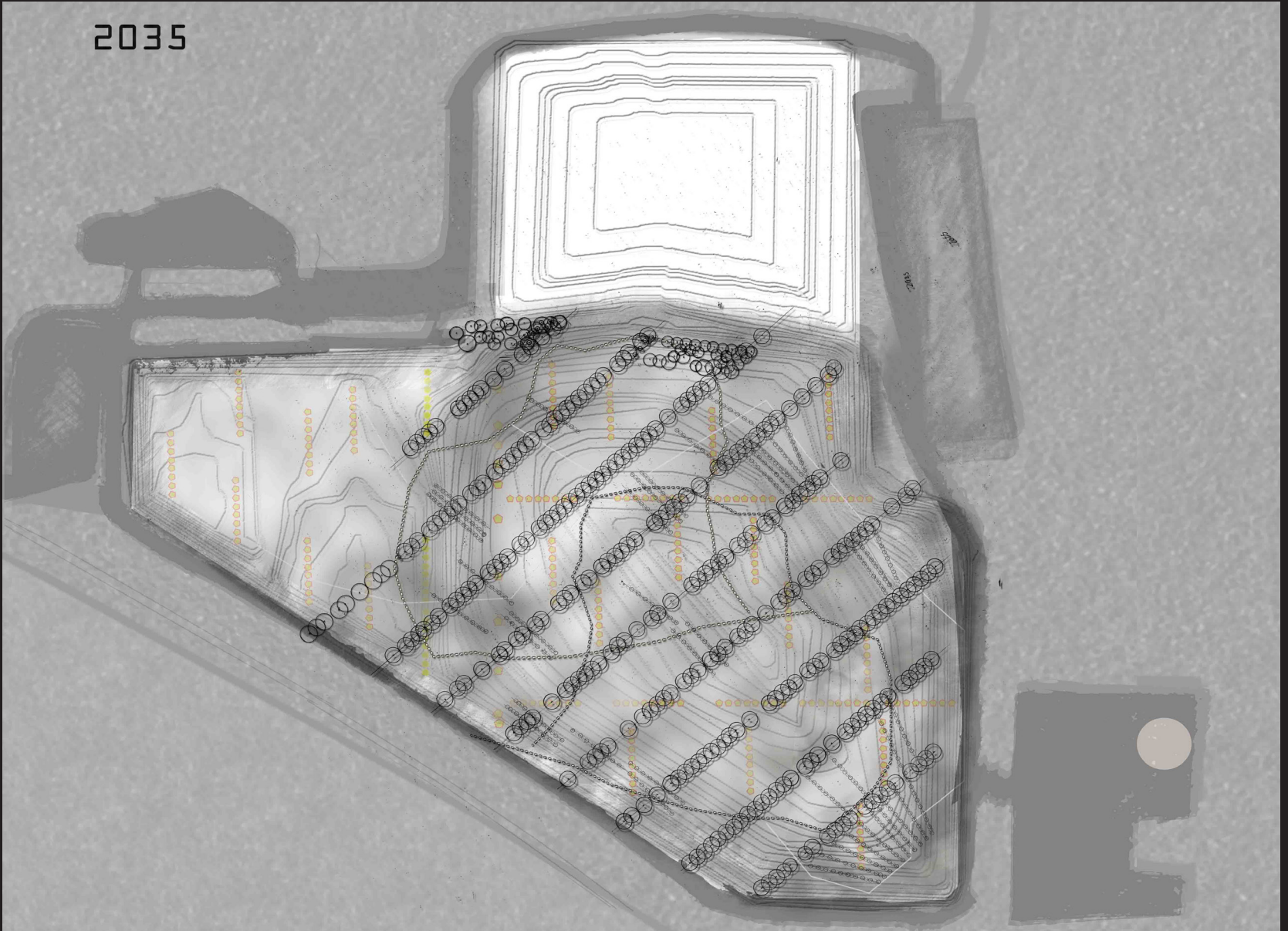
cell 1
capped



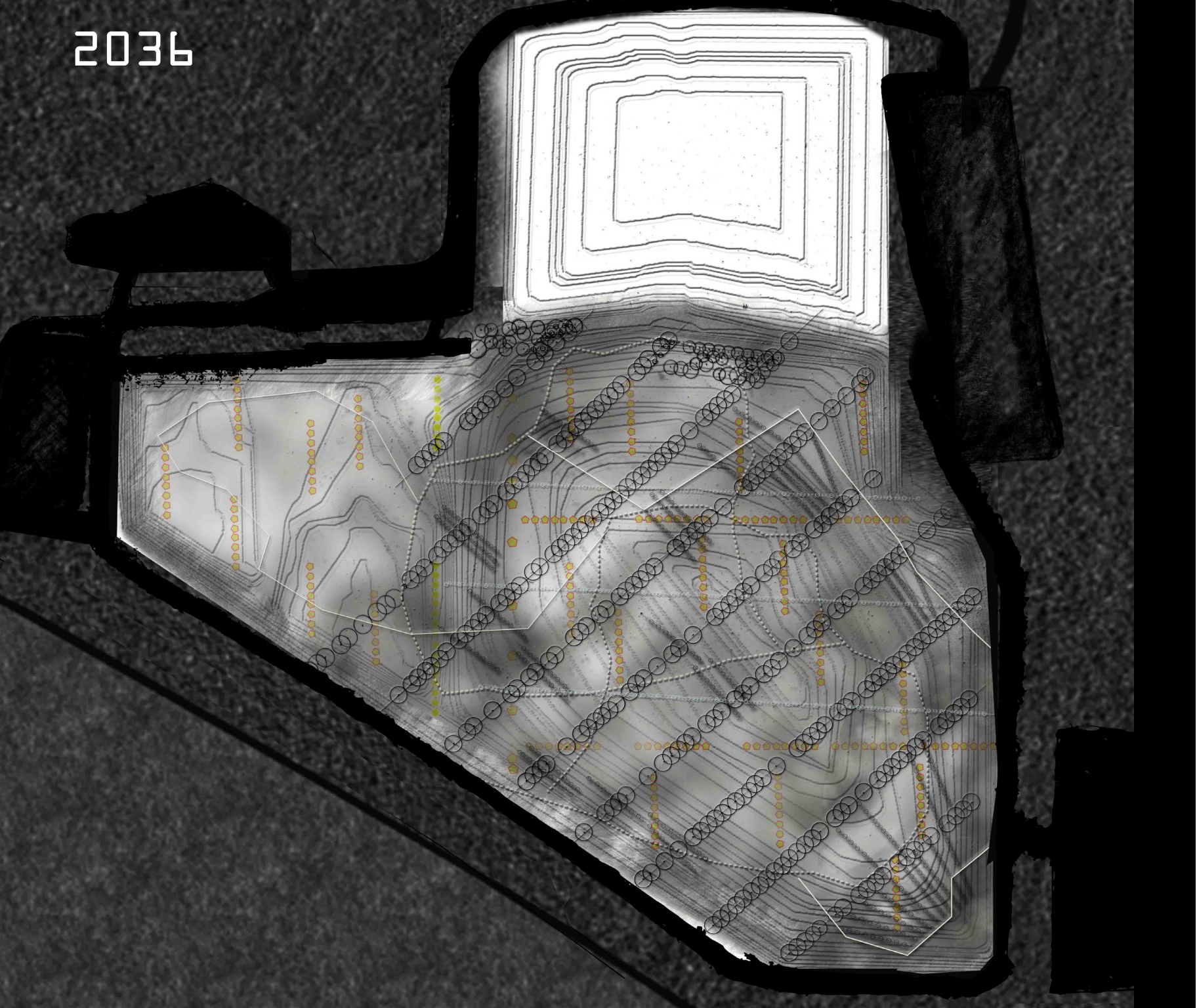
2025



2035



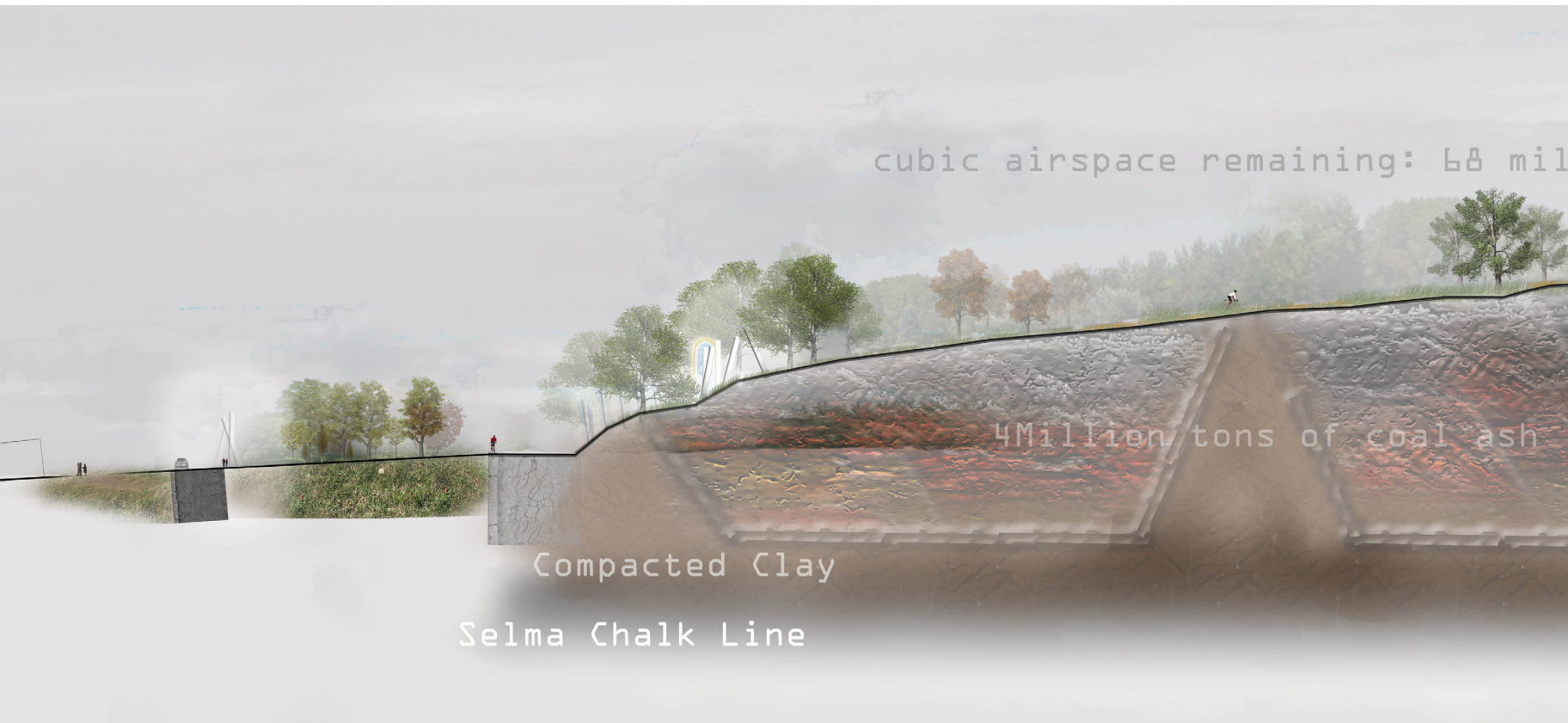
2036



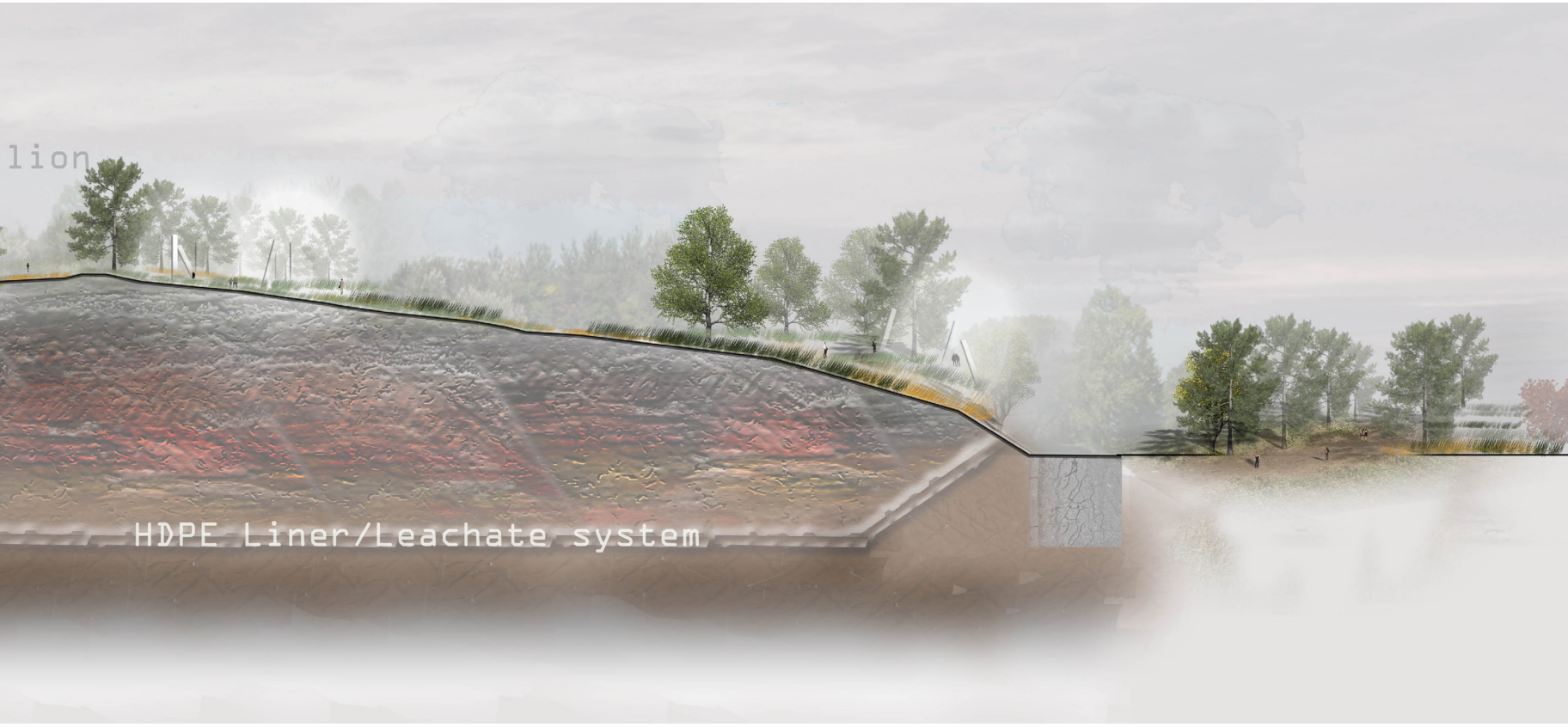
2045



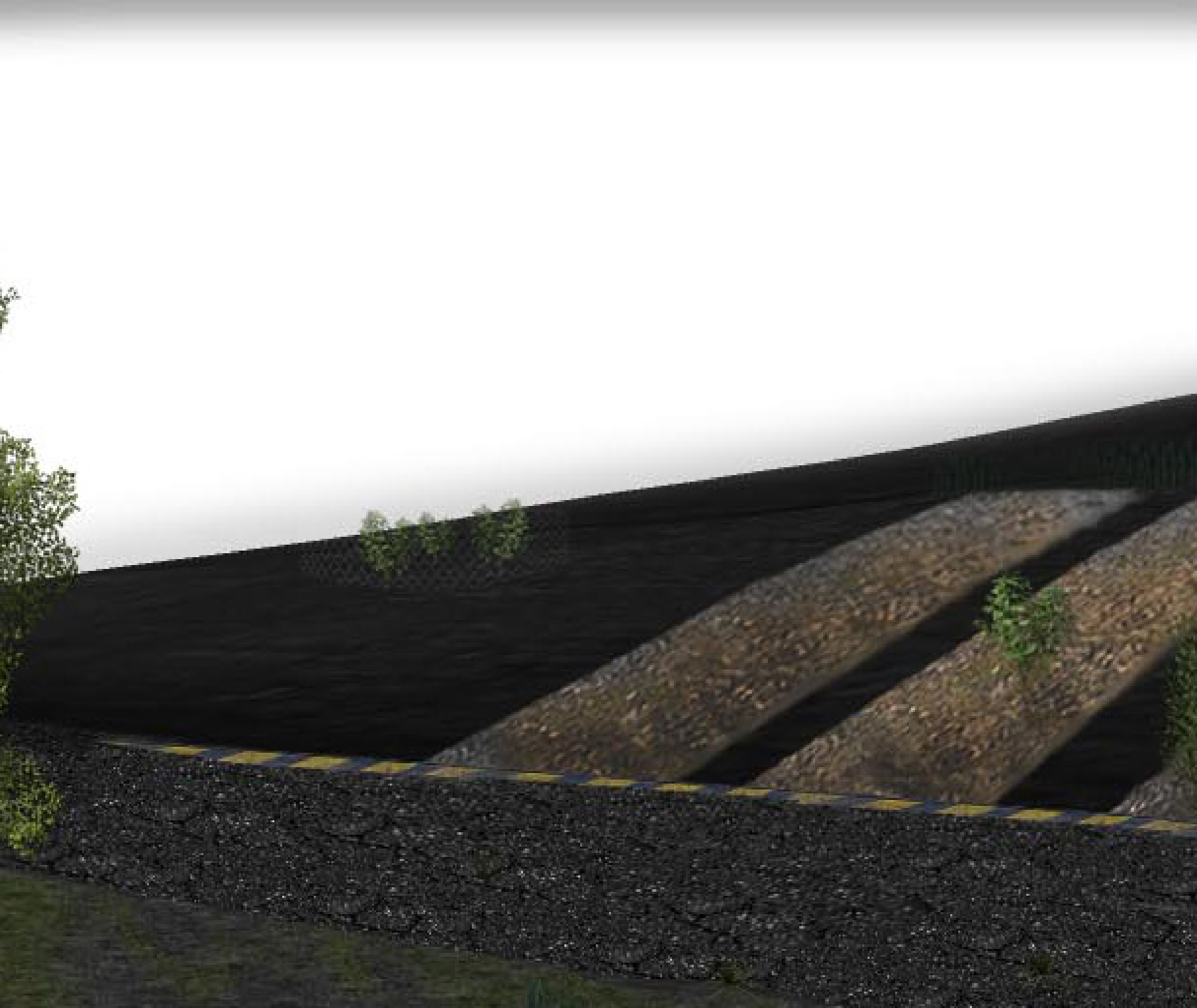
Phase 1 Section

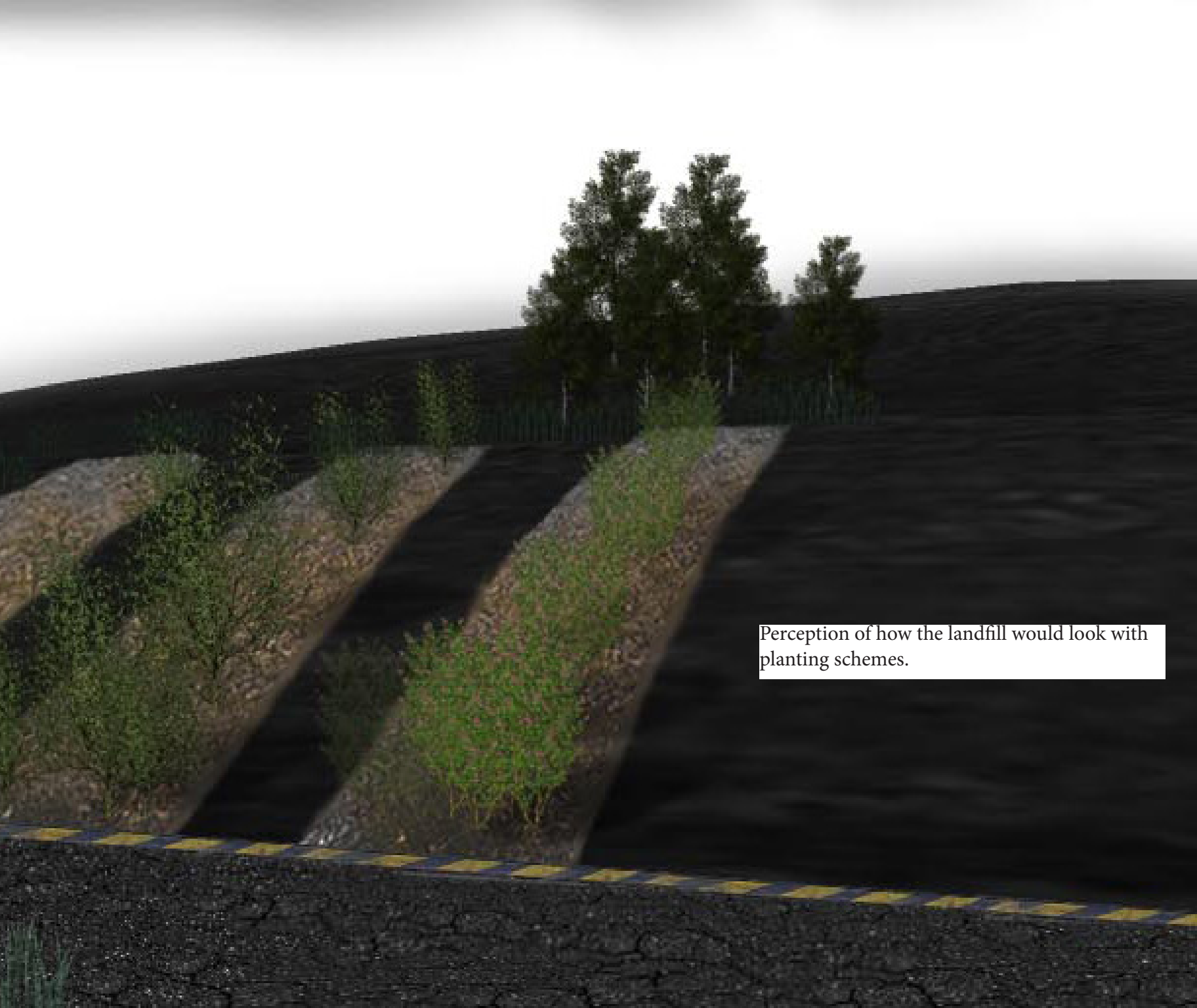


lion

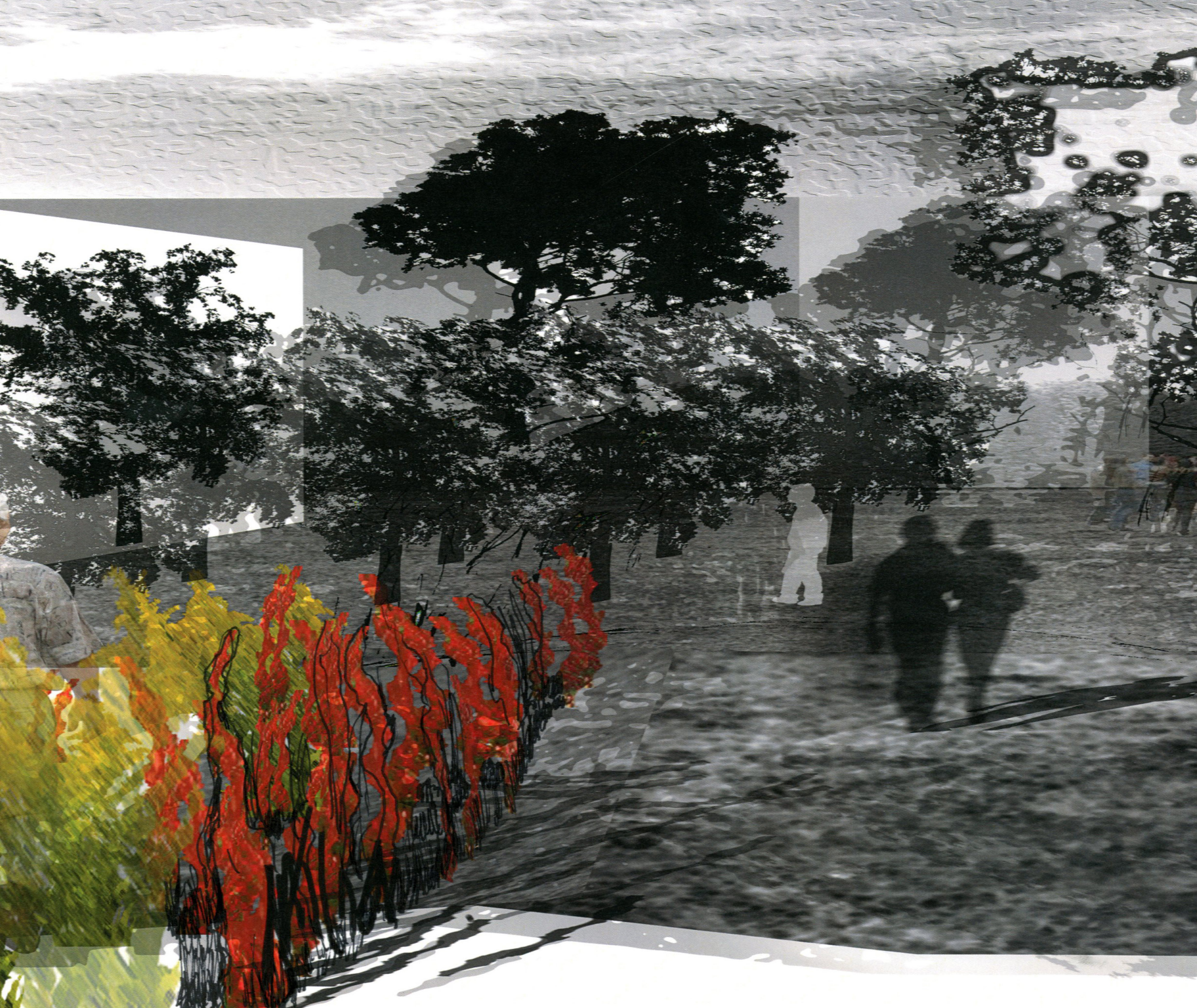


HDPE Liner/Leachate system



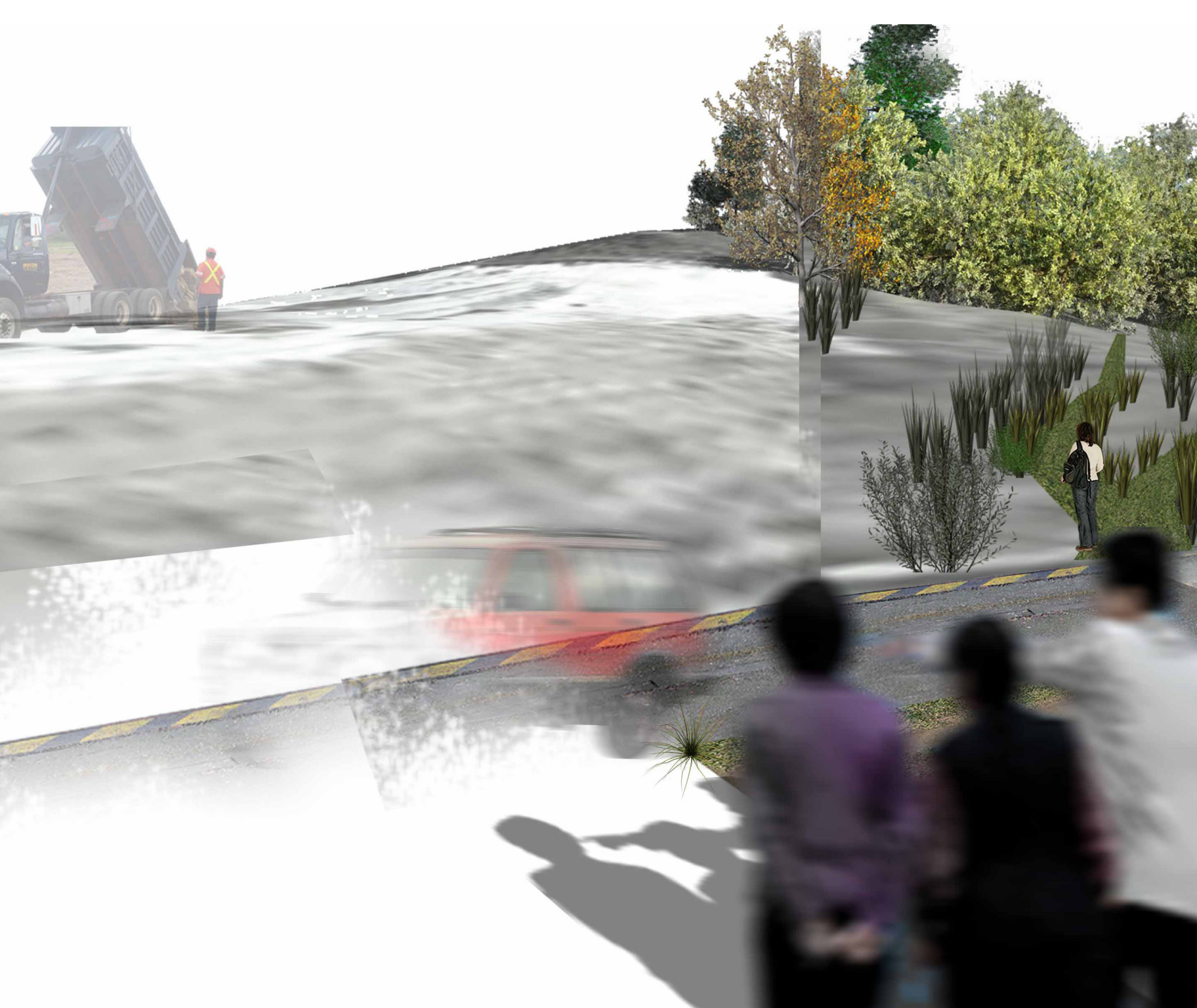


Perception of how the landfill would look with planting schemes.



ideogram of how landfill could look

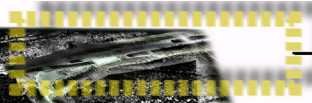




Classes coming out to record testing data and guided tours for students while others enjoy shade and passive recreation in their leisure time



Zoning Map



Future phase
Train entrance &
Factory locations



Arrowhead
employee
parking

Cell 6 open

Underpass to
Info/Landfill
Shack

Uphill training
Track

Cell 1 open

Public
Entrance

Stairway to
Center Court

Meadow
hillocks

Leachate Tanks

Observatory

Community
Parking

Open Field

Phase 2 Final Plan



Park Anatomy

What is nature exactly? Depending on the period park promoters viewed nature as either external to or inclusive of humanity. Romantic proponents, like many contemporary artists and scientists, saw nature as an interrelated world of mind, body, and being, an organic whole that included God, people and the physical world. Social problems, they concluded, came from the physical disjunction that developed between nature and people in any city large enough to be dominated by streets and buildings. Despite the numerous positive connections between urbanization and progress recognized by park backers and others, they nonetheless viewed the city as a dangerous environmental aberration that could lead to the disruption of society. Parks were the necessary corrective because they brought nature, which was God's handy work balanced and inherently good back into cities....Focusing on the visual aspects of parks, romantic advocates believed that parks should mostly be composed of water features, lawns, shrubs, and trees with the occasional random smattering of flowers, they thought it neither necessary nor desirable to have clearly organized plantings or activities within parks. Such things as athletics and large flower beds were banned or marginalized because they interfered with a visitor's ability to be improved by contemplating the beauty of the larger landscape scene. (Terance Young 2008)

On the other hand rationalistic park advocates, by contrast tend to see themselves as separate from nature treating it as a system of component parts. These boosters rejected the notion that the scenic landscape in a park reformed society, because they did not have a Darwinian, mechanistic view of nature replaced a romantic teleologic one the physical world came to be seen as unbalanced, morally ambiguous, and, like any mechanism, subject to human design and assembly. Consequently, the importance of contemplating nature faded and parks were reborn as favored settings for organized leisure. Rhododendron... and tulip beds, art museums, baseball and children's play became common park features as rationality park champions persuaded their formula for encouraging the good society, "There is no use trying to treat a place in the middle of a crowded city on the wilderness motive" urged one advocate of design from the book *Claiming Public Space*. "The thing to do is to frankly recognize that its beauty, it is to have any, must be civic beauty." No longer would social improvement be left to the beguiling charms of a passive park vision, for the rationalistic park advocate it was time to take charge of society's directional change. (Terance Young 2008) This is the format for typical city parks within cities. The researcher is looking to bring out elements within the landfill to the people of Perry county Alabama. He would also show the potentials of these landfills even though they were placed strategically in these primarily minority neighborhoods.

Inspirations to design



Tift buffalo ,NY Nature
preserve/Observatory
area



Sai Tso Wan, Hong
Kong/Reuse of power
landfill generates



Mt.Trashmore Va
beach/ Hillock mound
section

Passive: Nature Preserve/Remediation

Hybrid Poplars

Upper Deck/Observatory

Infiltration layer

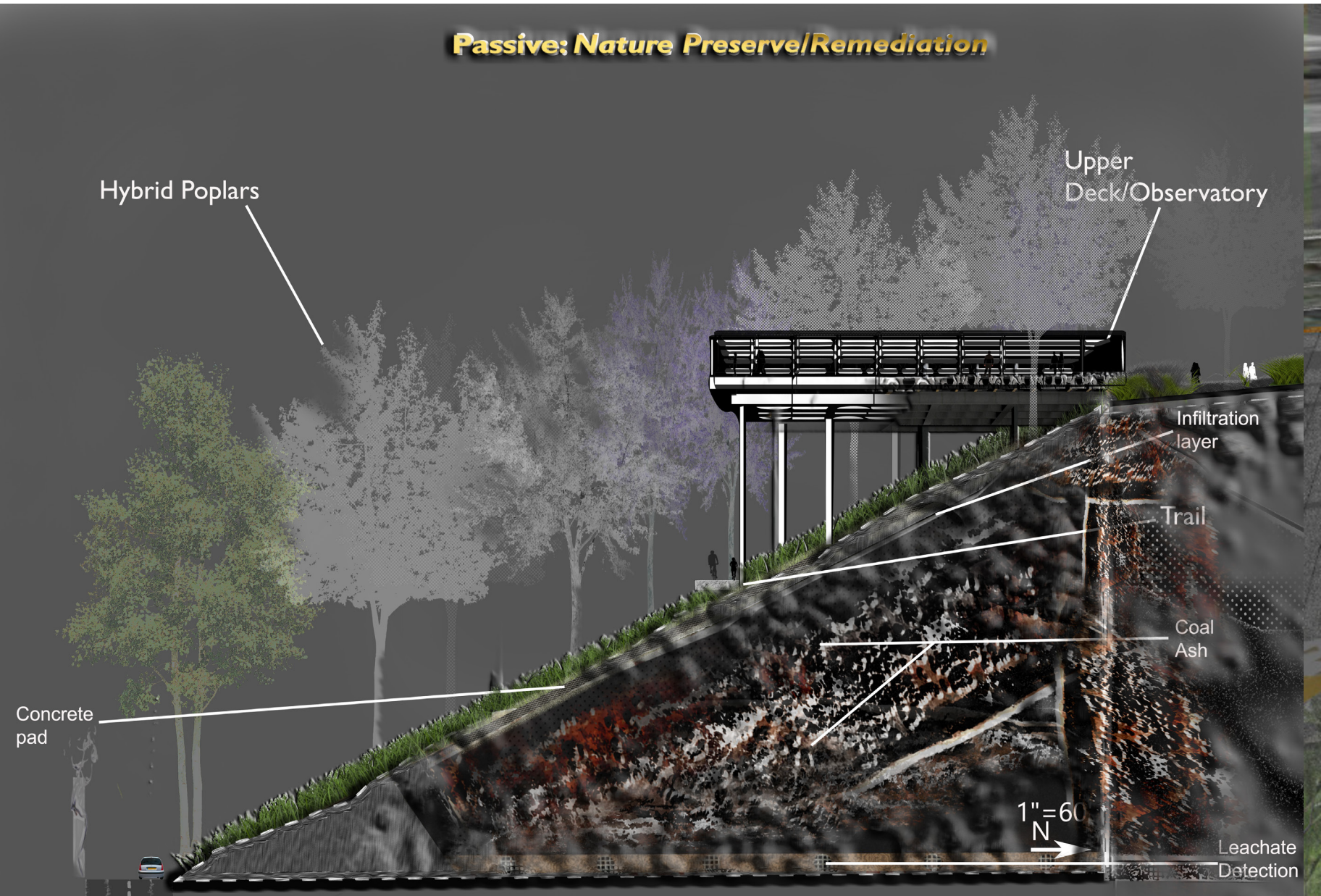
Trail

Coal Ash

Concrete pad

1" = 60'
N

Leachate Detection





The observation deck is not only for viewing back into the community right across the street but it also contains a system of combustible methane at spontaneous times .

Hillock perspective



Methane Monitoring system

Cahaba road perspective with ground water monitoring wells

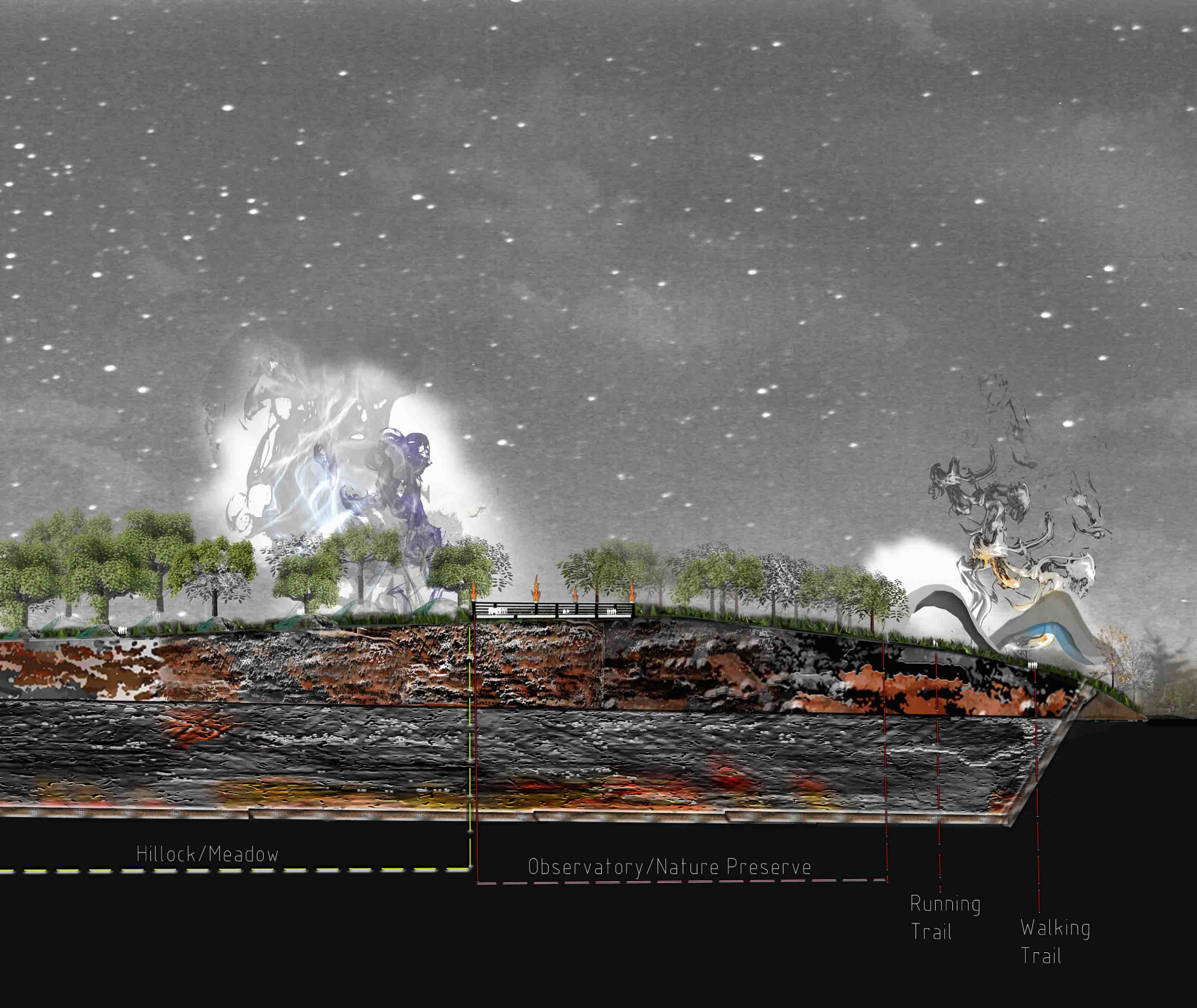


© 2014 Google



Phase 2 Section





Hillock/Meadow

Observatory/Nature Preserve

Running Trail

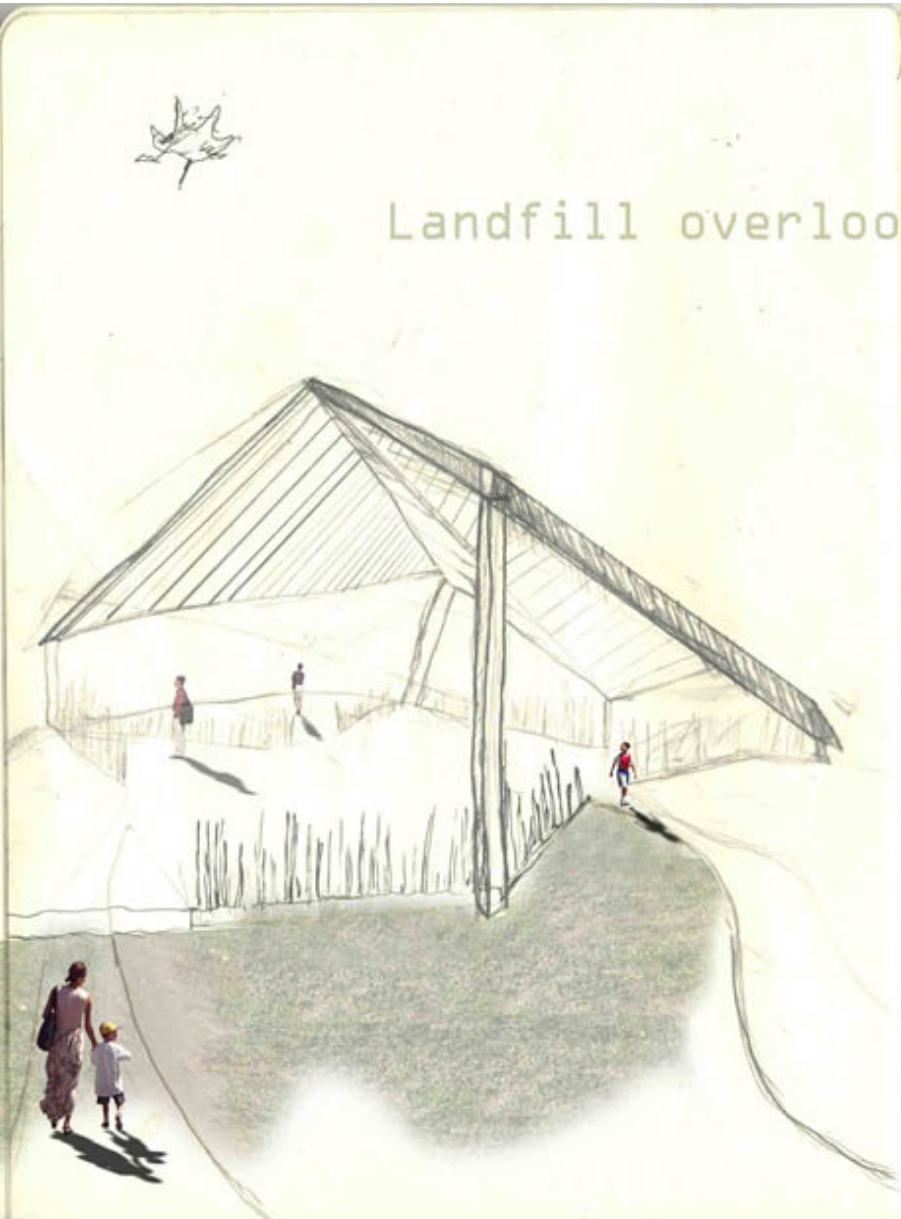
Walking Trail

Methane Grilling

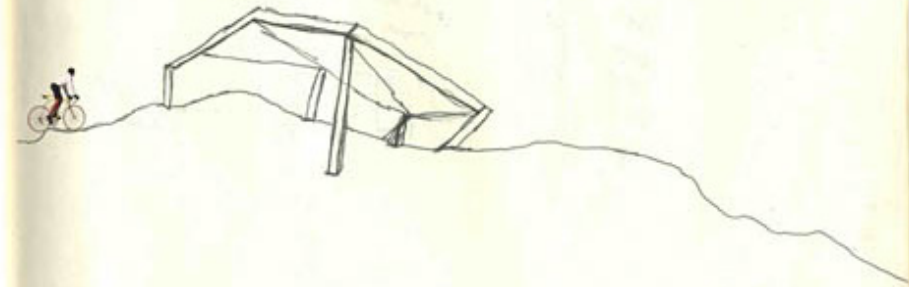


Glance at Process Sketches

Allows visitors to view into areas of landfill operations. image on their right page displays how the new vapor colored monitoring systems are integrated into the design of the lookout areas



Landfill overlook stations



High point views
into landfill operations





QUICK CONCEPT SKETCHES



Methane Monitoring system

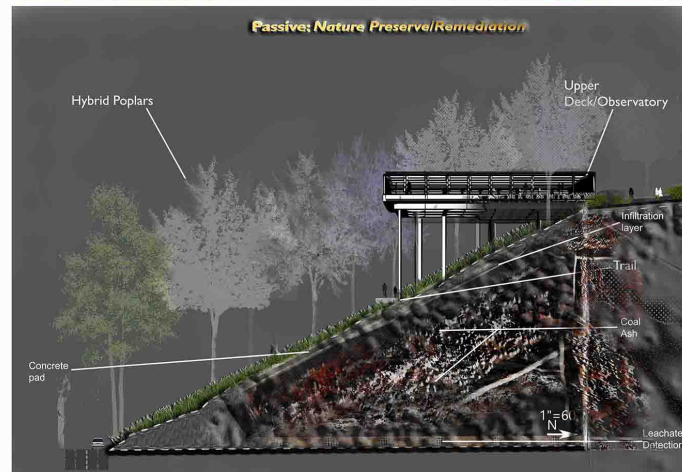
SKETCH OUTPUTS

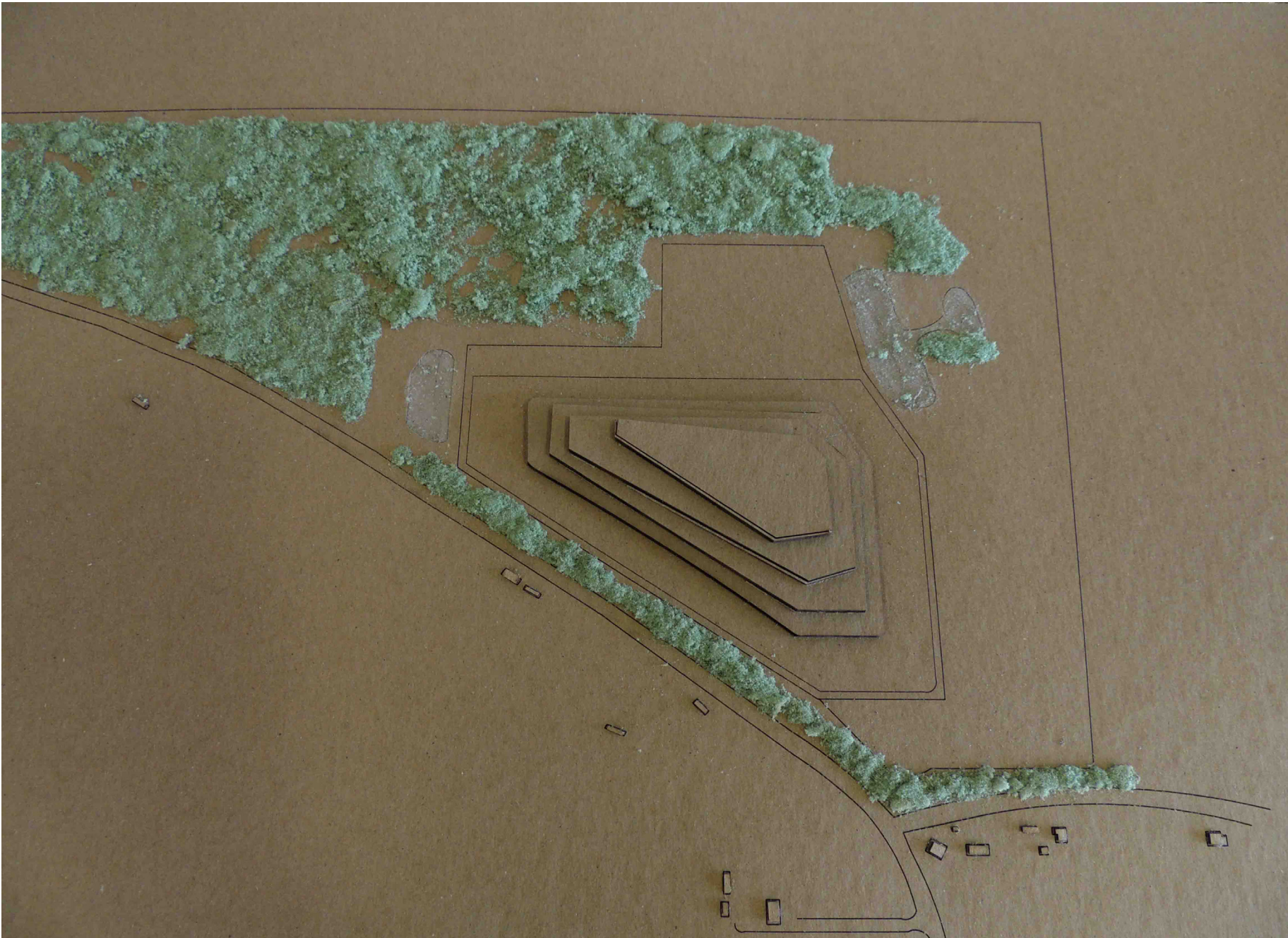


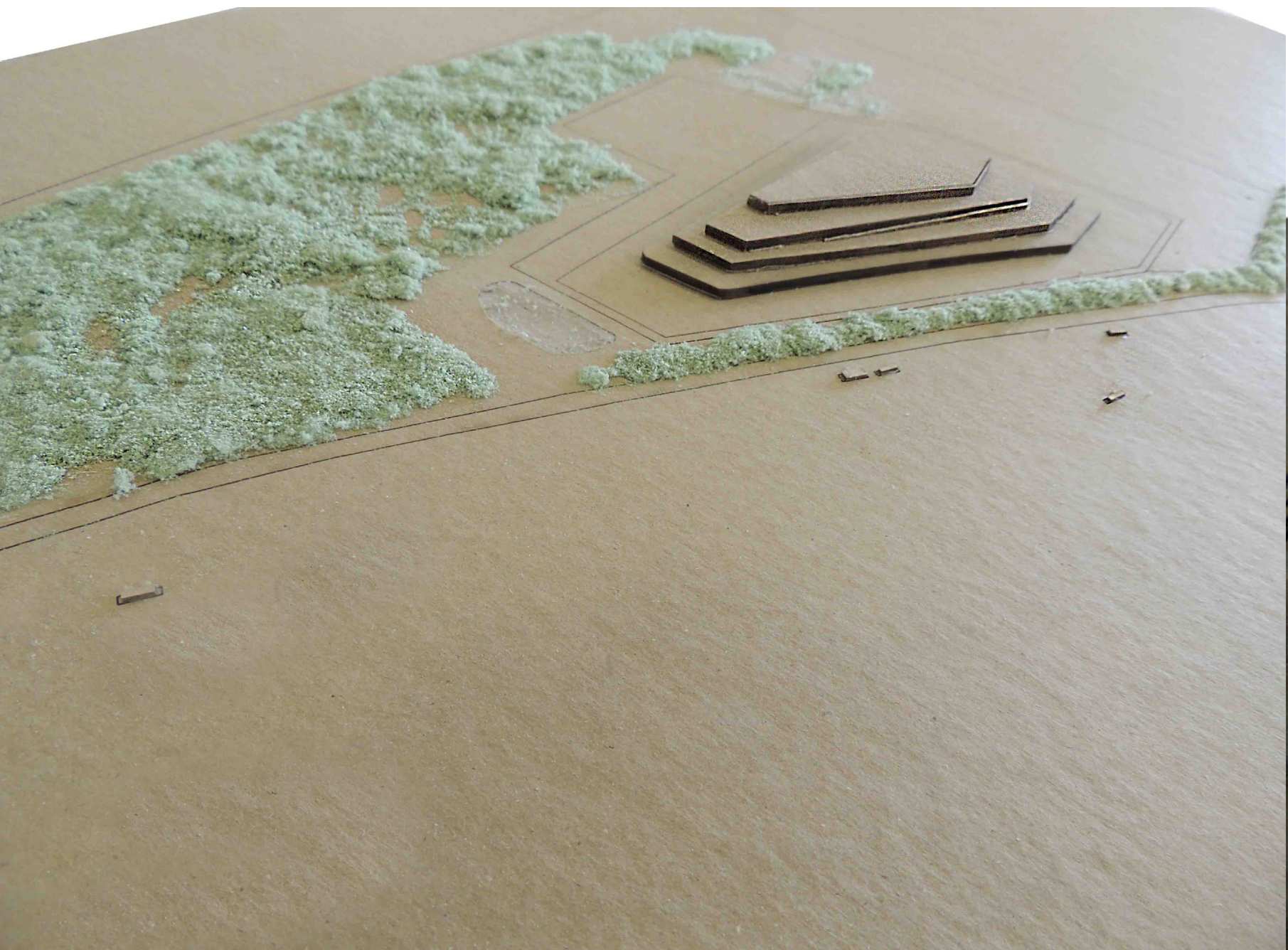
NATURE PRESERVE OBSERVATORY
PERSPECTIVE



SECTION











IV. Reflections

The value of knowledge taken away from this project is that all neighborhoods are not created equally. According to Peter Haanrik for park consideration there is a hierarchy of six elements which are the following: Population density, wealth, cars, bicycles, sidewalks, and time. A wealthier neighborhood has less need for nearby parks than poorer areas because the rich are more likely to have bigger yards greener trees and private amenities for example pools tennis courts and private clubs. Nest neighborhoods that are low density but have high levels of car ownership and easy parking do not require as many parks nearby. The luxury of having a vehicle reduces the challenge of going to a park. Also low density neighborhoods have a good amount of land that is unused and with that in mind if parkland is needed to be increased it is wise to create more housing units on the empty land and have commercial development around the edges of neighborhood. The researcher became well versed about the elements of the neighborhood, like the sidewalk. If there are many good side walks in neighborhoods they are liable to be seen as serving the purpose of people to people sociability functions similar to park. This is even more true if these sidewalks include stoops, railings to sit or lean against in addition to tree shade.

Parks accomplish more than sidewalks but sidewalks have the advantage of being close the houses which add a feeling of safety. The neighborhood with less or poor sidewalks get a partial compensation for more parks. A good example of this is in Louisiana 2003 Boyle Heights these residents live in low income area but they exercise hourly and they have a shortage of parks to jog around. Therefore, they have a local graveyard that they use to jog around which had no definite path to do this activity but it was used regardless. The sidewalk that existed around the private owned graveyard had roots bulging out, and deep potholes and not many cross walking areas. The community got together and lobbied for an appropriate place for daily exercise and eventually was awarded with a rubberized sidewalk and since the upgrade the track is used from 200-1000 people.

Neighborhoods and how time plays into the role of the need of park space. The closer a park is the greater ease there is for people of low income to be able to visit it. It may seem that the wealthier class would have less time to go to parks than those living in a low income area but its hard for lower income homes to make time while working 1-3 jobs and even more difficult for the single parent low income homes. One of the most important things through all the learning process is how strong politics can play a role in where and what are in parks. Overall the political process allocates tax dollars for parkland. This was done multiple times for parks in New York such as Central Park and New York park.

By learning so much about parks and the process of how they work the idea of experience came to mind. Also, the need to create a new experience as a park design and landfills together by combining new education to local colleges and unveiling the systems of the landfill so that the community and anyone else who visits the landfill can learn and report of anything that they believe is going wrong within the site due to the new monitoring systems that are in place. These new ideas can be offered to the profession of landscape architecture as new ways to see landfills in a new light and making them become more of an asset to a community than a burden. It also makes landfills become more of an attraction when they are able to work with the community members rather than slyly going through loop holes blind siding communities. This thesis challenges designers to take on these out of sight out of mind landforms and more importantly the people and ecology that resides there rather than always going for the easy reclaimable. Get out of your comfort area and help these equal communities through a new design experiences on landfills in all injustice areas.

V. References

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image:
Basketball courts in 2050
landfill park at night

