AMERICAN UNIVERSITY OF BEIRUT

UNDERGRADUATE CAPSTONE PROJECT
IN
LANDSCAPE ARCHITECTURE

SUBMITTAL FORM

DE-DUMP ECOLOGICAL RESTORATION

by

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DE-DUMP ECOLOGICAL RESTORATION

FINAL YEAR PROJECT

YASMINA YEHIA
2015 · 2016
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THE CHOSEN SITE FOR THE FINAL YEAR PROJECT IS LOCATED IN BOURJ HAMMOUD, LEBANON. BOURJ HAMMOUD IS SITUATED ON THE EASTERN SIDE OF THE BEIRUT RIVER, REMAINING A PROXIMATE LOCATION TO THE CITY.

BOURJ HAMMOUD HAS ALWAYS BEEN ASSOCIATED TO A RESIDENTIAL NEIGHBORHOOD, TIED TO AN ARMENIAN IDENTITY. IT SEEMS THOUGH, THAT PEOPLE ARE UNAWARE THAT BOURJ HAMMOUD HOLDS A COASTLINE WHICH TODAY IS A HIGHLY INDUSTRIAL ONE.

THE FOCUS OF THE STUDY WAS TO UNDERSTAND THE COASTLINE OF BOURJ HAMMOUD IN RELATION TO ITS BACK BONE, BEING THE RESIDENTIAL QUARTERS.

THE STUDY CONSISTED OF ASSESSING THE FIRST IMPRESSIONS TO THE SITE. LATER, THE STUDY WAS ORIENTED TOWARDS THE UNDERSTANDING OF THE WHOLE AREA OF BOURJ HAMMOUD WITH EXTENSIVE SITE INVENTORY. THE SITE INVENTORY WAS BASED ON DIFFERENT SCALES RANGING FROM THE NEIGHBORHOOD SCALE TO THE LOCAL SCALE.

THE SITE ANALYSIS, WHICH WAS BASED ON RELATING THE SITE CRITERIA AND SITE INVENTORY PROVED SOME VERY CRITICAL ELEMENTS WHICH WOULD SURFACE DURING THE DESIGN PHASE.

THE SITE PROPOSES SOME VERY CRITICAL ISSUES, SPLIT INTO THREE LAYERS:

THE FIRST LAYER WOULD BE TO ACKNOWLEDGE THAT THE SITE IS MIS-USED AND HAS LOST ITS HISTORICAL IDENTITY TO AN INDUSTRIAL ONE.

THE SECOND LAYER BEING THE ECOLOGICAL LAYER, IMPACTS SEA AND LAND HABITAT, AND AFFECTS ADJACENT ECOLOGICAL VALUES SUCH AS GROUNDWATER AND CHEMICAL POLLUTION, SOIL CONTAMINATION AS WELL AS ODOR POLLUTION.

THE THIRD LAYER WOULD BE ITS GEOGRAPHICAL LOCATION, THE SITE HAS NOT REACHED ITS CAPACITIES AS A FUNCTIONAL SITE AS IT IS DISCONNECTED FROM ITS MAIN NODE.

THE GOAL IS TO RECONNECT THE BOURJ HAMMOUD WATERFRONT BACK TO ITS RESIDENTIAL QUARTERS, WHILE FOCUSING ON RESTORING THE ECOLOGICAL VALUES OF THE SITE.
"LANDSCAPE (...) AS A METAPHOR FOR INCLUSIVE MULTIPLICITY AND PLURALISM, AS IN A KIND OF SYNTHETIC OVERVIEW THAT ENABLES DIFFERENCES TO PLAY THEMSELVES OUT. IN THESE TERMS, LANDSCAPE MAY STILL EMBRACE NATURALISTIC AND PHENOMENOLOGICAL EXPERIENCE BUT ITS FULL EFFICACY IS EXTENDED TO THAT OF A SYNTHETIC AND STRATEGIC ART FORM, ONE THAT ALIGNS DIVERSE AND COMPETING FORCES (SOCIAL CONSTITUENCIES, POLITICAL DESIRES, ECOLOGICAL PROCESSES, PROGRAM DEMANDS, ETC., INTO NEWLY LIBERATING AND INTERACTIVE ALLIANCES" (CORNER, 2002)

BASED ON HIS ANALYSIS, JOERN LANGHORST BUILT HIS THEORY UPON JAMES CORNER'S THEORY OF RECOVERING LANDSCAPES.

ACCORDING TO LANGHORST, BROWNFIELDS AND POSTINDUSTRIAL SITES ARE VERY INTERESTING BECAUSE THEY CREATE AN OVERLAP BETWEEN HUMAN AND NON-HUMAN COURSES, WHICH ARE COMPRESSED AND LAYERED INTO ISSUES TACKLING THE CULTURAL, SOCIAL, ECONOMICAL, ECOLOGICAL, FRAGMENTATION LAYERS WHICH TIP-OFF INTERRELATIONS BETWEEN MAN AND HIS INTERACTION WITH THE ENVIRONMENT.

HE USED FOUR CASE STUDIES BASED ON POST INDUSTRIAL PARKS: LANDSCHAFTSPARK, DUISBURG-NORD, BYXBBEE PARK AND GAS WORKS PARK. BASED ON HIS ANALYSIS ON THESE FOUR PARKS, HIS HYPOTHESIS SHOWED THAT DESIGN SOLUTIONS NEED TO TAKE INTO ACCOUNT THE HISTORY, PHYSICAL REMNANTS, SOCIO-CULTURAL AND ECONOMIC CONTEXTS. THE DESIGN BECOMES A SUCCESS ONCE THE PHYSICAL DESIGN AND THE CONTRIBUTION OF THE PROCESS OF THE PLACE ARE MERGED. BASICALLY, IT BECOMES IMPORTANT TO UNDERSTAND THE DESIGN OF SUCH A SITE AS A CHRONOLOGICAL INFRASTRUCTURE, WHICH USES A PARTICULAR WAY OF READING THE LANDSCAPE, PERCEIVING THE SURFACE OF IT WITH ITS CULTURAL, SOCIAL, ECONOMICAL, ECOLOGICAL IMPLICATIONS AS A RELATION ARRANGING ONTO THE SURFACE.

REFERENCES:


LANGHORST, JOERN W. ’00127 RISING FROM RUINS: POSTINDUSTRIAL SITES BETWEEN ABANDONMENT AND ENGAGEMENT." (N.D.): N. PAG. OCT. 2015. WEB.


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1915-1918 - TIMELINE

1920's

1930's-1940's

1950's-1980's

1990's-today

---


AT THAT POINT, THE ARMENIAN GENOCIDE TOOK PLACE. LATER, ONCE ARMENIANS BEGAN TO EMIGRATE INTO LEBANON, THEY MOVED MAINLY INTO KARANTINA TO INSTALL THEIR CAMPS WITH GRAND CAMP SAINT MICHEL AND CAMP OF KARANTINA.


IN THE 1930’S, OTHER AREAS LIKE NOR ADDANA, GULABACHENE ALSO JOINED THE URBAN FABRIC.

IN 1939, CAMP SANDJAK WAS INSTALLED. AT THAT POINT, BOURJ Hammoud HAD BEGUN ITS EXPANSION, THE WATERFRONT WAS USED AS A PUBLIC SANDY BEACH AND NAHR BEIRUT WAS USED FOR SWIMMING.


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Before zooming into the site, it was important to understand the residential quarters of Bourj Hammoud.

The neighborhood proved to be very dense especially once compared to Beirut.

**BOURJ HAMMOUD**
- 2.4 square kilometres
- 150’000 estimated inhabitants
- 62’500 inhabitants per square kilometre

**BEIRUT**
- 85 square kilometres
- 1’700’000 inhabitants
- 20’000 inhabitants per square kilometre

The figure ground density map is main proof of the history of the urban fabric of Bourj Hammoud. It is important to understand that the people are the ones responsible for such a dense urban setting.

The main reference behind the understanding of their identity was **Portraits of Survival: The Armenians of Bourj Hammoud**, a book by photographer Ariane Ateshian Delacampagne. The below pictures are from her book, the text is a summary of hers.

**Profile of People**

**AVAK SISILIAN, 1933**
- born in Syria, his parents were from Hadjin/Tomarza from Turkey.
- Avak specializes in shoe making, using very old machines dating back to 1946.

**TANIEL TSUNGULIAN, 1933-2009**
- born in Lebanon, his parents were from Kayseri, Turkey.
- he excelled at repairing oriental rugs and kilims, he eventually opened his own shop which he worked in until he died.

**BOGHOS SVAJIAN, 1951**
- born in Lebanon, he was called the Kalashnikov because he used Russian rifles to protect his neighborhood during the war.
- he fishes off Bourj Hammoud coast which he sells on Marash Street.
- he also acted in plays like the Honorable Beggars by Hagop Baronian.

**CHAHE YEREVANIAN, 1971**
- born in Beirut, his grandfather fled from Kharput, Turkey.
- he took over his father’s company which consisted of building affordable housing for the residents of Bourj Hammoud.
- the company is very large and successful till today.

**HARUTIUN TOROSSIAN, 1933**
- born in Beirut, his father was one of the only people to survive the genocide.
- he studied at ALBA and teaches painting of landscapes and intimate scenes.
- he chose to move to Bourj Hammoud rather than stay in Paris where his family resides.

**YEGHISSAPET APIKIAN, 1926**
- born in Tripoli, descending from Siverek/Kharput, Turkey.
- studied literature at AUB, she helps her husband with a bridal boutique store for fitting and renting.
THE RESIDENTS OF BOURJ HAMMOUD PROVED TO BE RESILIENT, HARDWORKING AND CREATIVE. NONETHELESS IT WAS STILL IMPORTANT TO UNDERSTAND THE SPACES THEY USE, HOW THEY ARTICULATE THEIR NETWORK.

A LAND USE MAP WAS CRUCIAL FOR THAT. TOWARDS THE COASTLINE, THE USE IS MAINLY INDUSTRIAL. TOWARDS THE CORE OF BOURJ HAMMOUD, THE MAIN USES ARE RESIDENTIAL, COMMERCIAL, COMMERCIAL MANUFACTURING. THERE ARE LOTS OF SCHOOLS, CHURCHES, A FEW MOSQUES TOWARDS THE SOUTHERN AREA OF BOURJ HAMMOUD. BOURJ HAMMOUD IS VERY DYNAMIC, WITH MOST OF ITS COMMERCIAL ACTIVITIES HELD ON THE STREET LEVEL.

IT WAS ALSO IMPORTANT TO UNDERSTAND HOW THE RESIDENTS USE THE STREET NETWORKS THAT SURROUND THEM. BOURJ HAMMOUD IS SURROUNDED BY MAJOR CONNECTORS SUCH AS DORA HIGHWAY, EMILE LAHOUD BOULEVARD, PIERRE GEMAYEL AVENUE, MIRNA CHALOUHI AVENUE, YEREVAN FLYOVER. ALOT OF THE STREETS IN BOURJ HAMMOUD ARE NAMED AFTER ARMENIAN CITIES: YEREVAN FLYOVER AND ARAX STREET FOR EXAMPLE. DISTRICTS AND STREETS ARE ALSO NAMED AFTER TURKISH ARMENIAN CITIES LIKE MARASH, SIS, ADANA, CILICIA ETC.
BOURJ HAMMOUD HAS A CHARACTER OF ITS OWN BELONGING TO A VERY ACTIVE ONE. ONE OF THE MAIN ISSUES WITH BOURJ HAMMOUD IS THAT DESPITE ITS VERY DENSE AND ACTIVE NEIGHBORHOOD, IT LACKS PUBLIC SPACES. IT IS ALSO AN AREA WHERE ITS WATERFRONT IS DISCONNECTED FROM ITS RESIDENTIAL AREA.

WALKING AROUND BOURJ HAMMOUD IS WALKING THROUGH ALL OF THE DIFFERENT ACTIVITIES RANGING FROM JEWELRY WORKSHOPS, SHOE MAKING WORKSHOPS, AS WELL AS SANDWICH KIOSKS, JUICE KIOSKS, TO ELECTRONICS SHOPS. OCCASIONALLY, GRAFFITI APPEAR, WHETHER STENCILS OR SPRAY PAINTED, SHOWING LOTS OF RESILIENCY.

**CHARACTER COLLAGE**

AFTER LOOKING INTO THE GENERAL CHARACTER OF BOURJ HAMMOUD, IT WAS IMPORTANT TO START ZOOMING INTO THE SITE OF STUDY - CIRCLED IN BLACK DASHED LINES

IT WAS ESSENTIAL TO IDENTIFY THE LANDMARKS WITHIN THE CHOSEN SITE. THE MAIN ELEMENTS ON SITE ARE THE TWO MAIN ARTERIES BEING THE DORA HIGHWAY AND THE SEA SIDE ROAD, NAHR BEIRUT ON THE LEFT. NAHR BEIRUT IS MAIN FRONTIER BETWEEN BEIRUT AND BOURJ HAMMOUD.

TOWARDS THE COASTLINE, THERE ARE SOME HIGH IMPACT INDUSTRIES LIKE UNIGAS, DEMCO STEEL. THERE ARE ALSO PLACES FOR LEISURE SUCH AS THE GRAND FACTORY, AND MYU. IN BETWEEN THE SEA SIDE ROAD AND THE DORA HIGHWAY, ARE OFFICES AND SHOWROOMS LIKE VOLVO AND VANLIAN GALLERY.

BENEATH THE DORA HIGHWAY, BEGIN THE RESIDENTIAL QUARTERS OF BOURJ HAMMOUD, MAINLY REACHING INTO ARMENIA STREET AND THE MUNICIPALITY SQUARE.

**LANDMARKS**

![Map of Bourj Hammoud with landmarks](image-url)
AFTER LOOKING INTO THE DIFFERENT LANDMARKS, IT WAS IMPORTANT TO START LOOKING INTO THE DIFFERENT COMPONENTS OF THE SITE.

THE ROADS, BEING MAIN ELEMENTS WERE SPLIT INTO FOUR CATEGORIES:
1. TERTIARY ROADS WHICH RANGE FROM 0 TO LESS THAN 5 METERS
2. SECONDARY ROADS WHICH RANGE FROM 5 TO 20 METERS
3. TERTIARY ROADS WHICH EXCEED 20 METERS
4. HIGHWAYS

// ROADS MAP BASED ON WIDTHS

BASED ON THE DIFFERENT ROAD WIDTHS, IT WAS IMPORTANT TO SET THE DIFFERENT CRITERIA ON SITE TO FIGURE OUT WHICH ROADS ARE ACCESSIBLE AND WHICH ARE NOT. THE CRITERIA WAS BASED ON ACCESSIBILITY WHICH WAS ASSESSED THROUGH DEAD ENDS AND BARRIERS.

// ROADS MAP BASED ON ACCESSIBILITY

1: 20 000
ONCE THE SITE APPEARED TO BE UNACCESSIBLE IN CERTAIN AREAS, IT BECAME IMPORTANT TO UNDERSTAND THE OWNERSHIP OF THE LAND.

THE LAND IS OWNED BY:
1. PRIVATELY
2. PUBLICLY
3. MARITIME DOMAIN

LOOKING INTO OWNERSHIP WOULD MEAN LOOKING INTO LAND USE OF THE SITE. THE SITE IS USED FOR INDUSTRIAL, CRAFTSMANSHIP INDUSTRIES, BUSINESS AND TRADE, AND RESIDENTIAL COMMERCIAL.

WHILE THE INDUSTRIAL USE SEEMED QUITE DOMINANT, IT WAS IMPORTANT TO UNDERSTAND ITS RESPECTIVE ZONING.

THE INDUSTRIAL ZONING REVEALED TO BE SPLIT INTO THREE CATEGORIES BEING:
1. CI: COMMERCIAL INDUSTRIAL
2. LI: LIGHT INDUSTRIES
3. GI: GENERAL INDUSTRIES
THE SITE, HOLDING DIFFERENT USES, ALSO COMPRISSES BUILDINGS THAT RANGE FROM SEVEN TO TEN FLOORS. THESE BUILDINGS ACT AS VISIBILITY BARRIERS, BEING THE MAIN REASON BEHIND THE DISREGARDING OF THE COASTLINE. PEOPLE WHO ARE NOT FROM THE AREA ARE NOT AWARE OF THE DUMP OR THE FISHERMEN’S PORT FOR EXAMPLE.

TO ANALYSE THE VISIBILITY SPAN BASED ON THE BUILDING HEIGHTS, IT WAS IMPORTANT TO SET A COUPLE OF VISIBILITY NODES:
1. THE TWO PEDESTRIAN BRIDGES ON THE DORA HIGHWAY - IN BLACK
2. TWO MAIN POINTS ON THE SEA SIDE ROAD - IN TURQUOISE
3. THE DUMP AS THE HIGHEST LEVEL OF VISIBILITY

THE PEDESTRIAN BRIDGES ON THE HIGHWAY ALLOWED FOR A INCOHERENT VIEW SPAN WHEREAS THE VIEW ON THE SEA SIDE ROAD WAS MUCH MORE DETACHED. THE VIEW OF THE DUMP WAS MORE CONSISTENT.
THE LAND USE AND ITS CONSTITUENTS SUCH AS THE BUILDINGS EXPOSE THE SITE TO DIFFERENT ACTIVITIES. THE MAIN ACTIVITIES ON SITE ARE FISHING, LEISURE, FURNITURE SHOPPING, AND UNsurprisingly BASED ON PETROLEUM CIRCULATION.

TO ASSESS THE ACTUAL DAILY CIRCULATION, THE INFORMATION WAS ALSO BASED ON THE LAND USE MAP AND INDUSTRIAL ZONING MAP (REFER TO PAGES )

ACTIVITIES ON SITE

INDUSTRIAL ZONING BASED ON DAILY PETROLEUM CIRCULATION

IT WAS IMPORTANT TO START ZOOMING INTO THE ELEMENTS WITHIN THE SITE, MAINLY DECODING THE DIFFERENT ECOLOGICAL VALUES.

FIRSTLY, THE DUMP’S PRESENCE ON THE SITE WAS QUITE IMPORTANT.

THE DUMP HAS A FOOTPRINT AREA OF 20 HECTARES BASED ON CHARACTERIZATION STUDIES, THE WASTE COMPOSITION IS HIGH ON FOOD WASTE CONTENT (GREATER THAN 50%) AND HIGH MOISTURE CONTENT (38%), TYPICAL OF WASTE IN DEVELOPING COUNTRIES. 6 MILLION CUBIC METERS CONSISTS OF DEMOLITION DEBRIS, EXCAVATION MATERIAL, MUNICIPAL SOLID WASTE, INDUSTRIAL AND HOSPITAL WASTES.

LFG : LANDFILL GAS
LFG RATES FOR THE BOURJ HAMMOUD DUMP ARE 0.24L/M2 PER HOUR. CLOSED LANDFILL CRITERIA FALLS WITHIN 0.06-0.66L/M2 PER HOUR WHILE ACTIVE LANDFILL CRITERIA FALLS WITHIN 0.42-2.46L/M2 PER HOUR. THIS PROVES THAT THE BOURJ HAMMOUD DUMP IS CONSIDERED A CLOSED LAND FILL AS IT FALLS WITHIN THE CLOSED LANDFILL CRITERIA.

CONTROL MEASURES IMPLEMENTED AT THE SITE HAVE BEEN LIMITED TO THE DEPLOYMENT OF A SOIL COVER ALONG WITH DRILLING OF SEVERAL PENETRATING GAS VENTS.
THE LANDFORM OF THE DUMP WAS IMPORTANT TO UNDERSTAND, THE TOPOGRAPHIC LINES WERE MAIN HELP TO FIGURING OUT THE SLOPES. THE SLOPES ARE IMPORTANT TO LOOK INTO IN CASE THE DUMP WAS GOING TO BE USED FOR THE DESIGN PHASE. THE SLOPE ANALYSIS PROVED TO BE QUITE STEEP.

// TOPOGRAPHIC LINES MAP

NOT TO SCALE

// TOPOGRAPHY BASED ON SLOPE ANALYSIS

NOT TO SCALE

DUE TO THE GEOGRAPHICAL LOCATION OF THE SITE, WHICH HOLD A LARGE STRIP OFF THE MEDITERRANEAN SEA, WIND ANALYSIS WAS IMPORTANT FOR POTENTIAL FUTURE INTERVENTIONS. TO BE ABLE TO ANALYZE WIND VELOCITY BASED ON SEASONS, IT WAS IMPORTANT TO LOOK AT THE WIND SPEEDS.

WIND SPEED WAS BASED ON THE BEAUFORT SCALE RANGING FROM 0 TO 6 BFT ACCORDING TO EVERY MONTH OF THE YEAR AND BASED ON DAYS.

// WIND SPEED

// WIND SPEED AND DIRECTION BASED ON SEASON

winter

spring

summer

fall
ONCE GIVEN AUTHORIZATION TO ACCESS THE SITE OFF THE COASTLINE NEARBY THE DUMP, IT WAS VERY SURPRISING TO DISCOVER THE LUSH VEGETATION THAT WAS PRESENT. THE VEGETATION COVER CONSISTED OF SHRUBS, GRASSES, SOME TREES LIKE ACACIA AND EUCALYPTUS, FICUS NITIDA.
THE FAUNA CONSISTED OF A FEW WHITE BUTTERFLIES, LOTS OF GRASSHOPPERS AND SOME SNAILS.

// VEGETATION MAP

// FAUNA - FLORA PALETTE
THE LAVISH VEGETATION COVER WAS VERY INTRIGUING, ESPECIALLY IN AN AREA SURROUNDED WITH HIGH IMPACT INDUSTRIES AND A LARGE DUMP.

THE OBSERVED ABUNDANT VEGETATIVE COVER IS CONSISTENT WITH LOW LFG GENERATION RATES, SINCE EXCESSIVE GAS EMISSIONS WOULD INHIBIT THE GROWTH OF PLANTS. THE LOW LFG GENERATION LEVELS ARE ALSO CONSISTENT WITH THE OCCURRENCE OF VARIOUS DEEP-SEATED FIRE EVENTS OBSERVED DURING ON-SITE INSPECTIONS, INDICATING A DECREASED LEVEL OF LFG GENERATION THAT IS CONSEQUENTLY ALLOWING THE ENTRY OF OXYGEN INTO THE WASTE MASS AND ULTIMATELY BREAKING OUT IN THE FORM OF LOCALIZED FLAMES.

VEGETATION OBSERVED BELONG TO RUDERALS
DEFINITION OF RUDERAL ACCORDING TO THE OXFORD DICTIONARY:
“A PLANT GROWING ON WASTE GROUND OR AMONG RUBBISH”

AS FOR THE SOIL, WHICH HAS BEEN BROUGHT IN FROM DIFFERENT SOURCES WHEN RECLAIMED, HAS REACHED AN ECOLOGICAL SUCCESSION.
With the water being base and most exposed to pollution, proved to be highly polluted due to petroleum volatilization and steel galvanization. Both activities also contaminate the soil.

**Waterways**

![Diagram of waterways](image)

Lastly, the site has proved the following issues:

1. It is highly contaminated
2. It is highly ecologically disturbed
3. It is unaccessible - visually and physically
4. It is misused
5. It is disconnected from its backbone, being the residential core of Bourj Hammoud

The site, located in a very strategic area, has a lot of potential. As said earlier, it has not reached its capacity as a coastline or even as a waterfront.

It is important for the site to become a well designed site that links back to its core.

**Industrial zoning and waterways based on pollution**

![Diagram of industrial zoning and waterways based on pollution](image)
THREE CONCEPTS WERE DEVELOPED BEFORE MATURING INTO THE FINAL CONCEPT. THE MAIN PURPOSE IS AGAIN TO RECONNECT THE BOURJ HAMMOUD WATERFRONT BACK TO ITS RESIDENTIAL QUARTERS, WHILE FOCUSING ON RESTORING THE ECOLOGICAL VALUES OF THE SITE.

THE MAIN GOAL IS FOUND IN THE THREE CONCEPTS, BUT EACH CONCEPT FOCUS ON A DIFFERENT WAY OF RECONNECTING THE WATERFRONT TO THE RESIDENTIAL QUARTERS.

THE FIRST CONCEPT TACKLES THE LARGER SCALE OF THE SITE, MAINLY FOCUSING ON OFFERING ORGANIZATION TO THE AREA WHILE LOOKING AT THE URBAN FABRIC AND URBAN SETTINGS WITHIN THE EXISTING LAND.

THE SECOND CONCEPT IS FOCUSED ON THE COMMUNITY SCALE AS A POTENTIAL OPEN PUBLIC SPACE FOR THE PEOPLE. IT IS ABOUT LOOKING AT THE URBAN INFRASTRUCTURE AS AN ATTRACTIVE AREA. THE ECOLOGY WOULD BECOME A SECOND LAYER IN THIS OPTION. THE FLOW OF DIRECTION IS ABOUT BRINGING THE RESIDENTS INTO THE ATTRACTIVE OPEN PUBLIC SPACE.

// CONCEPT 1 LANDSCAPE PLANNING

// CONCEPT 2 CELEBRATING THE WATERFRONT
THE THIRD CONCEPT IS FOCUSED ON CREATING A SORT OF A GREEN CORRIDOR WHICH INSTEAD OF BECOMING AN ATTRACTIVE SITE, WOULD ACTUALLY BECOME PART OF THE URBAN FABRIC PLUNGING INTO THE RESIDENTIAL AREA. IT WOULD HAVE THE PURPOSE OF MERGING THE WATERFRONT WITH THE RESIDENTIAL AREAS OF BOURJ HAMMOUD, TARGETING ALSO THE ECOLOGICAL VALUE.

THE CHOSEN CONCEPT WAS THE THIRD CONCEPT, THIS CONCEPT WAS DEVELOPED INTO A NEXUS. THE GOAL REMAINS TO RECONNECT THE NEIGHBORHOOD OF BOURJ HAMMOUD TO ITS RESPECTFUL COASTLINE THROUGH A GREEN STRIP GATHERING A SERIES OF PARKS. THE SEQUENCE OF PARKS BELONG TO THE LOCATION THEY ARE IN, CONSEQUENTLY THE DIFFERENT PARKS INVOLVE ECOLOGICAL PARKS, PLAZA AND MARKETS.

THE BENEFITS OF THIS PROPOSAL ARE:

• SOLVE THE MISSING LINK BETWEEN THE RESIDENTIAL QUARTER AND THE MIS-USED COASTLINE
• TREAT THE ECOLOGICALLY DISTURBED COASTLINE
• OFFER THE RESIDENTS GREEN SPACES
• OFFER THE WORKERS, WHETHER INDUSTRIAL OR CORPORATE, GREEN SPACES AS WELL

CONCEPT 3 GREEN CORRIDOR

BUFFER ZONE FROM INDUSTRIAL AREA

CONNECTING GREEN CORRIDOR INTO RESIDENTIAL QUARTER

FINAL CONCEPT THE LOCAL NEXUS
TO APPLY THE FINAL CONCEPT ONTO THE ACTUAL SITE, IT WAS IMPORTANT TO DELINEATE THE OPEN SPACES ACCORDING TO THE CORRIDOR. THE STRIP WHICH FORMED ITSELF, WAS SUCCESSFULLY PLACED WITHIN THE SERIES OF PARK SHOWN BELOW.


ACCORDINGLY, THE LINK EVOLVED INTO A MULTIFUNCTIONAL DIMENSION ANCHORED BY THE THREE MAIN NODES: (1) THE LANDFILL, (2) THE URBAN PLAZA, (3) THE BOURJ HAMMOUD MUNICIPALITY. THESE THREE NODES, CONNECTED BY THE SOFT AND FUNCTIONAL LINK LOOP THROUGH THE DESIGN AND END UP BECOMING A SINGLE PLATFORM CONNECTING ALL OF THE DIFFERENT ELEMENTS ALL TOGETHER.

// MASTERPLAN

// SITE PICTURES CONNECTING THE VARIOUS SITES

// MASTERPLAN
THE LINK IS PURPOSED AT ENGAGING PEOPLE WITH THE LANDSCAPE, OFFERED AS AN ACCESS. IT IS IMPORTANT TO NOTE THAT THE TARGET IS STRICTLY PEDESTRIAN, ALLOWING ANYONE TO REACH EITHER ENDS IN 15 MINUTES.
MY FOCUS AREA IS LOCATED AT THE BEGINNING OF THE LINK. IT IS A BROWNFIELD WHICH HAS BEEN ISOLATED FROM THE URBAN FABRIC. THE SITE SPECIFIC APPROACH BELONGS TO RE-INTEGRATING ISOLATED INDUSTRIAL BROWNFIELDS BACK INTO THE URBAN ENVIRONMENT. THE APPROACH TACKLES THE REMEDIATION OF ECOLOGICAL LANDSCAPES WHICH CONNECT FROM THE REGIONAL SCALE INTO THE LOCAL SCALE.

THE FIRST STEP TO UNDERSTANDING REMEDIATING LANDSCAPES WAS TO LOCATED THE SITE SPECIFIC ELEMENTS, WHICH WERE IDENTIFIED AS AN OPPORTUNITY. THESE ELEMENTS CAN BE VISIBLE SUCH AS INDUSTRIAL REMAINS OR INVISIBLE LIKE WATER AND SOIL POLLUTION, TOPOGRAPHICAL LINES - OF THE EXISTING DUMP. (REF: PHYTOREMEDIATION AS GREEN INFRASTRUCTURE AND A LANDSCAPE OF EXPERIENCES - FRANK SLEEGERS)

THE REASON WHY THE SITE PLAN WAS CHOSE WAS BECAUSE OF THE SITE ISSUES IT OFFERS. ITS LOCATION IS ALSO AT THE STARTING POINT OF THE LINK FROM THE WATERFRONT
// WATER AND SOIL CONTAMINATION INDUSTRIAL ZONING AND WASTE DISPOSAL

GOAL • SOLVE WATER AND SOIL POLLUTION

Once these tangible and intangible elements have been spotted on the site, the design goals also surfaced. It was important to solve issues that had surfaced during site analysis such as accessibility, visibility and walkability.
THE KEY PRINCIPLES OF LANDSCAPE ECOLOGY TO URBAN ENVIRONMENTS CONFORMING TO A MULTILAYERED APPROACH IS TO PROVIDE A GREEN INFRASTRUCTURE DERIVING FROM ECOLOGICAL AND SOCIAL RELATIONSHIPS WITH AN EMPHASIS ON CONNECTIVITY.

THE HUMAN LEVEL, FITTING INTO SUCH SOLUTIONS BECOMES KEY FACTOR.

CONSEQUENTLY, THE MAIN THEMES DEVELOPED FOR THE SITE PLAN BECOME LINK & ACCESS, ECOLOGY, EDUCATION AND RECREATION.

THE DIFFERENT ELEMENTS ON SITE BECOME MULTI-FUNCTIONAL, FOR EXAMPLE:

**THE PHYTOREMEDIATION BEDS** SERVE AS:
- SOIL REMEDIATORS
- SERVE ALSO AS AN AESTHETIC EXPERIENCE ENJOYED BY THE VISITOR
- TEACH THE VISITOR ABOUT THE REMEDIATION

**THE OUTDOOR AMPHITHEATER** SERVES AS:
- LECTURE AREA FOR LECTURES ABOUT REMEDIATION INNOVATIONS
- LARGE RECREATIONAL SEATING AREA
- AESTHETIC EXPERIENCE AS A GREEN INTRUSION
- SMALL CONCERTS OR ANY EVENTS CAN BE HELD AS WELL

**WETLANDS** SERVE AS:
- WATER REMEDIATORS
- SERVE AS AN ENJOYABLE EXPERIENCE- PEOPLE LOVE WATER
- TEACHES PEOPLE ABOUT WATER REMEDIATIONS
- WATER BRINGS PEOPLE TOGETHER

**THE RESEARCH CENTERS** SERVE AS:
- RESEARCH AREAS FOR INNOVATIVE SOLUTIONS
- RECYCLING OF SHIPPING CONTAINERS - BECOME RESEARCH LABS
- OPEN FOR THE PUBLIC TO WATCH
- VISITORS CAN WALK BY AND THROUGH

**ECOLOGY:** THE GOAL WAS TO INTENSIFY THE USE AND EXPERIENCE OF ECOLOGICAL SOLUTIONS

**EDUCATION:** THE RESEARCH LABS BECOME PART OF THE SITE AND THE SEATING AREA, PEOPLE LEARN WHILE TAKING A WALK
// LINK & ACCESS
THE SITE OFFERS A LINK FROM THE WATERFRONT ALL THE WAY INTO THE NEIGHBORHOODS OF BOURJ HAMMOUD

// ECOLOGICAL
THE SITE OFFERS WATER AND SOIL TREATMENTS BUT ALSO TEACHES THE VISITOR ABOUT ITS PROCESS

// RECREATIONAL
THE ECOLOGICAL PARK OFFERS VARIOUS TYPES OF EXPERIENCES WHETHER WALKING, JOGGING, AND LEARNING

// EDUCATIONAL
OUTDOOR RESEARCH CENTERS WHICH INVEST IN INNOVATIVE SOLUTIONS FOR REMEDIATION LECTURES ABOUT THESE SOLUTIONS WILL BE GIVEN IN THE OUTDOOR AMPHITHEATRE
PHYTOREMEDIATION is an emerging technology which uses plants and their associated rhizospheric microorganisms to remove pollutants from contaminated sites.

CONSTRUCTED WETLANDS are artificial wetlands purposed at treating anthropogenic discharge (municipal waste/industrial waste and stormwater runoff).
THE CHOICE FOR THE GROUND SURFACES: The main pathway is stabilized decomposed granite, which is the most natural replacement to concrete. It is a permeable alternative. The color chosen is a whitish grey. The different protrusions/landforms will be structured with concrete and the rest will be either soil or vegetation. Finally, the buffer areas which are not accessible will be planted in soil; it would offer the visitor a very natural setting and a better understanding at the remediation of the soil.

THE CHOICE FOR THE BENCHES: Use recyclable wood and mold it with the shape of the landforms; the benches also become part of the landscape. (Refer to the perspectives of the site)

AS FOR THE RAILING: Because of the difference in levels, the goal was to apply different types of railing depending on the setting. If the goal is to have security measures then the rails become metal; if the goal is to create transparency of visibility then the rails become glazed.

// CONCLUSION

BEFORE

AFTER

// SECTION B-B
CASE STUDY 1 // VALL D’EN JOAN WASTE DUMP, SPAIN, 2001 TILL NOW
THEME: LANDFILL RESTORATION

LANDSCAPE ARCHITECTURE: BATLLE I ROIG (ENRIC BATLLE AND JOAN ROIG AS ARCHITECTS
TERESA GALí AS AGRICULTURAL ENGINEER)
LOCATION: EL GARRAF NATURAL PARK, BARCELONA, SPAIN
DESIGN: 2002
CONSTRUCTION: 2003-2010
AREA: 85 HA
COST: 26.000.000 €

SINCE 1974, THE LANDFILL WAS THE URBAN WASTE PRODUCED BY BARCELONA AND THE
CITIES AROUND IT. LOCATED IN A VALLEY, THE LANDFILL WAS MADE OF STEEP SLOPES
COVERING THE WHOLE VALLEY. THE RESTORATION PROJECT’S AIM WAS TO USE “SINGLE
OPERATION” TO TACKLE THREE ASPECTS ON THE SITE:
1. SOLVE A COMPLEX TECHNICAL PROBLEM
2. CREATE A NEW PUBLIC SPACE
3. CREATE A NEW LANDSCAPE

THE SITE WAS TACKLED FROM DIFFERENT DISCIPLINES: ENVIRONMENTAL ENGINEERING,
GEOLOGY, LANDSCAPE ARCHITECTURE AND AGRONOMY. THE MAIN ISSUE DERIVED WAS
OF STABILIZING THE LANDFILL WITH TERRACES AND EMBANKMENTS. THIS MAIN ISSUE
CREATED THE GEOMETRY OF THE DESIGN AND OF THE LAYOUT OF THE PIPING WHICH HAD
A PURPOSE OF COLLECTING AND CONDUCTING BIOGAS TO AN AREA WHERE IT WOULD BE
TURNED INTO ELECTRICAL ENERGY // DRAINING AND STORAGE OF LEACHATE // COLLECTING
RUN OFF.

THE DESIGN AND INCORPORATION OF THE TERRACES WERE INSPIRED BY AGRICULTURAL
SYSTEMS OF THE AREA: TOPOGRAPHY//HYDRAULICS//VEGETATION. THESE SYSTEMS
PROVED TO BE VERY EFFECTIVE IN RESTORING DAMAGED LANDSCAPES BECAUSE OF THE
WAY THEY ARE ORGANIZED AND MAINTAINED.
THE VEGETATION CONSISTED OF USING NATIVE SPECIES; SUCH AS TREES, SHRUBS, MAQUIS,
NATIVE LEGUMINOUS OF THE SURROUNDING FARM AREAS-THAT ARE RESISTANT AND THAT
REQUIRE LITTLE WATER. THE AIM IS TO EVENTUALLY INTEGRATE THE LANDFILL SITE TO THE
PROXIMATE GARRAF NATURAL PARK.

THE POINT OF THE RESTORATION WAS NOT ONLY TO INTEGRATE THE DESIGN INTO THE
LANDSCAPE, BUT ALSO TO SENSITIZE SOCIETY TOWARDS THE ENVIRONMENT. TO ALLOW
THE PUBLIC TO UNDERSTAND THE RESTORATION OF THIS LANDSCAPE, THEY’VE INSTALLED
INFORMATION CENTERS TO EXPLAIN THE WORK CARRIED OUT AND THE WORK THAT IS STILL
ONGOING.

FOR EXAMPLE, WALLS OF WASTE (PICTURE TO THE LEFT) AND PATHS OF EARTH WERE
INSTALLED TO REMIND THE PUBLIC OF THE LANDSCAPE’S ORIGIN, THE ROLE THAT IT PLAYED.
CASE STUDY 2 // CITY SQUARE DEVELOPING, LUXEMBOURG, 2011
THEME: REHABILITATING DISUSED SPACES

LANDSCAPE ARCHITECTURE: ALLESWIRDGUT
LOCATION: ESCH-SUR-ALZETTE, LUXEMBOURG
DESIGN: 2004
CONSTRUCTION: 2011
AREA: 11.000 M²

THE SITE WAS A NEGLECTED AND DISUSED INDUSTRIAL AREA. THE AREA WAS WIDE AND
ROUGH, AND COVERED BY MOSS AND BIRCH. THE GOAL OF THE DESIGN IS TO UNCOVER THE
HIDDEN QUALITIES OF THE SITE.
SEATING AREAS AND PLANTING OF NEW TREES WAS NECESSARY. THESE WERE INSTALLED
INTO ISLANDS AND AS FOCAL POINTS IN THE VAST SPACE.
THE USE OF MATERIALS LIKE CONCRETE, UNTREATED STEEL AND WOOD GIVE THE SITE A
ROUGH FEEL TO IT - JUST HOW IT USED TO BE.
THE 'STEEL COURT', WHICH USED TO BE A WORKING PARK WITH TRAIN TRACKS CROSSING
IT WILL BECOME ONE OF THE MAIN SQUARE AREAS. (PICTURE BELOW). THE LONG SQUARE
ALLOWS ACCESS TO THE NEW DISTRICT. IT IS A COMBINATION OF FORMS AND DIVIDE
BETWEEN THE NEW OFFICE AREAS AND THE OLD INDUSTRIAL FACTORIES.
THE QUESTION ASKED BY THE LANDSCAPE ARCHITECT WAS THE BASE BEHIND THE DESIGN :
‘HOW DO YOU COMBINE THE ABANDONED INDUSTRIAL YARD’S ATMOSPHERE – QUIET, MISTY,
STONEHENGE-LIKE – WITH THE REQUIREMENTS OF A MODERN AND REPRESENTATIVE CITY-
SQUARE?’
FIVE PRINCIPLES ALLOWED ALLESWIRDGUT TO PROPOSE THE FOLLOWING CONCEPTS:
1. KEEP IT SIMPLE : FORMS AND MATERIALS
2. MAKE THE MOST OF THE SITE’S EXISTING POTENTIAL : EDGES
3. CONCENTRATE THE DESIGN EFFORT IN DEFINED AREAS, PRESERVE THE SITE’S WIDENESS :
   ISLANDS
4. ONLY BUILD WHAT IS NECESSARY AT ONE TIME : JOINTS
5. UNOBTRUSIVELY REFINE THE USED ROUGH MATERIALS : PATTERNS

// MASTERPLAN OF THE SITE

// PICTURES THE SITE

// PERSONAL IMPRESSIONS

BEFORE
NEGLECTED AREA, DISUSED SPACE

AFTER
MANAGED SPACE, RE-USED AND
REINTEGRATED WITHIN THE CITY
CASE STUDY 2 // RED RIBBON IN TANGHE RIVER PARK, CHINA, 2011
THEME: WATERFRONT REVITALIZATION

LANDSCAPE ARCHITECTURE: TURENSCAPE
LOCATION: QINHUANGDAO, CHINA
DESIGN: 2006
CONSTRUCTION: 2008
AREA: 20 HA
AWARDS: ASLA

THE SITE WAS COVERED WITH LOTS OF TYPES OF VEGETATION COMPLIMENTING THE HABITATS NEARBY THE RIVER. UNFORTUNATELY, IT WAS ALSO USED AS A GARBAGE DUMP. EVENTUALLY THE SITE BECAME A DESERTED AREA AND INACCESSIBLE.

THE IDEA IS THE REVERSE OF CONVENTIONAL URBAN PLANNING, WHICH GENERALLY ADDRESSES POPULATION GROWTH AND IS MORE FOCUSED ON A CITY’S ECONOMIC DEVELOPMENT. INSTEAD IT WAS TURNED INTO FOCUSING ON THE ONLY ELEMENT OF THE LANDSCAPE. THE SITE, CONSISTING OF SUCH LUSH AND WILD VEGETATION WAS DESIGNED BY TURENSCAPE. HE USED A VERY SIMPLE TECHNIQUE OF IMPLEMENTING A ‘RED RIBBON’ WHICH REPRESENTS A 500 METERS LONG MEANDERING STEEL STRUCTURE. THIS MINIMAL INTERVENTION FUNCTIONS AS A SEATING, LIGHTING AND VIEW POINT TO THE SURROUNDING WILD LANDSCAPE.

COMPLIMENTING THE MEANDERING RED RIBBON, ALSO EXISTS BOARDWALKS AND BIKE LANES THAT FOLLOW THE SAME FORM.

THE RED RIBBON IS MADE OF FIBER STEEL AND GLOWS RED AT NIGHT. IT IS 60 CM HIGH WITH A VARYING WIDTH OF 30-150 CM.

TO ALLOW FOR ECOLOGICAL UNDERSTANDING, FOUR PAVILIONS HAVE BEEN DESIGNED ALONG THE RED RIBBON TO EDUCATE THE VISITORS OF THE PARK ABOUT THE NATIVE PLANTS AND ECOLOGY.

FOUR GARDENS OF WHITE, YELLOW, PURPLE AND BLUE FLOWERS HAVE BEEN SPREAD ALONG THE SITES THAT WERE USED AS DUMPS AND SLUMS.

THE PARK IS URBAN AND MODERN, BUT PRESERVES EXISTING ECOLOGICAL PROCESSES AND NATURAL SERVICES.
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Phytoremediation of toxic metals from soil and waste water

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BIOFILTERS (Bioswales, Vegetative Buffers, & Constructed Wetlands) For Storm Water Discharge Pollution Removal Guidance for using Bioswales, Vegetative Buffers, and Constructed Wetlands for reducing, minimizing, or eliminating pollutant discharges to surface waters By Dennis Jurries, PE NWR Storm Water Engineer DEQ Northwest Region Document January 2003
THANK YOU