CORREDOR DE AGUA URBANO
Sara Navrady
WITHDRAWAL ESTIMATES FROM HUECO BOLSON (MILLION M³)

1. Chapparal, NM: 1.33 M³
2. Industrial & Public Supply, TX: 16.04 M³
3. city of El Paso, TX: 62.21 M³
4. Fort Bliss Military Base, TX: 5.81 M³
5. Ciudad Juárez, MX: 71.83 M³
6. District 009, MX: 155 M³

TOTAL: 312.22 million m³

Steng, Z. & Devine, J. 2005

HUECO BOLSON
RATE OF EXTRACTION: RATE OF RECHARGE
5:1
SINCE IT OPENED IN 2009 THE CONEJOS MEDANOS AQUIFER HAS RIPTURED 10 TIMES, COSTING 6 MILLION MXP IN REPAIRS AND SPILLING POTABLE WATER INTO RESIDENTIAL AREAS.
85% CONNECTED TO SEWERS

96% CONNECTED TO WATER

SEWAGE PRODUCED
4,220 L/S

AVERAGE SEWAGE TREATED
2,800 L/S (66%)

1420 L/S SEWAGE RETURNED TO IRRIGATION CANAL

NO CONSUMABLE CROPS
Since the 1980s El Paso has been recharging the Hueco Bolson with treated wastewater. In 1993 El Paso’s Roberto Bustamante WWTP started directing treated water through the newly established 1.5km² Rio Bosque Wetlands Park during the off-peak irrigation periods. The park now hosts a variety of native plants and animals that have returned to the habitat. The border fence has limited the park’s expansion.

image from: http://www.archwetp.org
CASE STUDY ISSUES

MONO FUNCTIONALITY

NO CONNECTIVITY WITH THE REST OF THE CITY
PUBLIC TRANSPORT

BAD ACCESS TO HEALTH AND EDUCATION
POOR QUALITY OF PUBLIC AND GREEN SPACES

VAST OPEN UNDEFINED SPACES
SAME TYPOLOGY OF HOUSINGS
ANY DIFFERENCE BASED ONLY ON SIZE DEPENDING ON INCOME
INCOMPLETENESS OF THE INITIAL PLANNING
STATE PROVIDED SECURITY NOT ENOUGH
EXTORTION AS A SIDE EFFECT OF IT
CONCENTRATION OF ACTIVITIES IN ONE SPECIFIC AREA

BAD INFRASTRUCTURE
ROADS UNFINISHED
OPEN SEWAGE CROSSING THE NEIGHBORHOOD
LOW BUILT DENSITY
LOW INCOME

RIVERAS BUILT IN ALLUVIAL SOIL, WASTING FERTILE AGRICULTURAL LAND

FLOODING
LACK OF LOCAL ECONOMY
LACK OF PARTICIPATORY STRUCTURE FOR THE REPRESENTATION OF THE INHABITANTS
NO DIVERSITY IN INCOME GROUPS
What is required is a new mindset that might see the design of infrastructure not as simply
performing to minimum engineering standards, but as capable of triggering complex and
unpredictable urban effects in excess of its designed capacity. - Stan Allen
1 HOUSEHOLD = 12 m³ OF VERTICAL FLOW CONSTRUCTED WETLANDS

RIBERAS DEL BRAVO = 150 000 m³ OF CONSTRUCTED WETLANDS
47% of parks are undefined dirt patches
Wood decking with 10mm spacing
Polyethylene cap
90 x 90mm timber joists spaced @ 600mm
19mm x 89mm sill plate
Polyethylene waterproof barrier
200mm concrete retaining wall / water trough

Wetland plants
100mm coarse gravel
50mm perforated pipe @ 5m intervals
600mm sand
200mm coarse gravel
100mm French drain piping
polyethylene waterproofing
100mm concrete floor
ACTIVE RAINWATER STORAGE

PASSIVE RAINWATER STORAGE
Perpendicular trench gutter with steel grate flush with asphalt.

Precast 200 mm concrete channel with 400mm concrete cap/curb edge.

Redirected wastewater towards constructed wetlands.

2% SLOPE
COLLECTING WATER FROM A 100M STRETCH OF STREET WILL GENERATE 257M³ (or 257 000L) OF RAINWATER PER YEAR.
<table>
<thead>
<tr>
<th>NAME</th>
<th>SCIENTIFIC NAME</th>
<th>HEIGHT</th>
<th>WIDTH</th>
</tr>
</thead>
<tbody>
<tr>
<td>RAIN GARDENS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TREES</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WHITEHORN ACACIA</td>
<td>Acacia confusa</td>
<td>2700-4500</td>
<td>2700-4500</td>
</tr>
<tr>
<td>LITTLELEAF ASH</td>
<td>Fraxinus nigra</td>
<td>3800</td>
<td>2400</td>
</tr>
<tr>
<td>GOLDENBALL LEADTREE</td>
<td>Quercus velutina</td>
<td>3650-7600</td>
<td>3500-4500</td>
</tr>
<tr>
<td>ESCALFIRE LIVE OAK</td>
<td>Quercus daubneyana</td>
<td>6.00-12000</td>
<td>9.00</td>
</tr>
<tr>
<td>MEXICAN BLUE OAK</td>
<td>Quercus oblongifolia</td>
<td>9.00</td>
<td>9.00</td>
</tr>
<tr>
<td>SHRUBS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WHITE SAGE</td>
<td>Artemisia ludovicana</td>
<td>450-900</td>
<td></td>
</tr>
<tr>
<td>CENTENNIAL COYOTE BUSH</td>
<td>Baccharis pilularis</td>
<td>1200</td>
<td>500</td>
</tr>
<tr>
<td>WOOLLY BUTTERFLYBUSH</td>
<td>Buddleja monardifolia</td>
<td>1200</td>
<td>1200</td>
</tr>
<tr>
<td>FAIRY DUSTER</td>
<td>Calamintha conferta</td>
<td>75-250</td>
<td>900</td>
</tr>
<tr>
<td>OCOTILLO</td>
<td>Fouquieria splendens</td>
<td>6000</td>
<td></td>
</tr>
<tr>
<td>SILKTASSIL</td>
<td>Gymnocalycium</td>
<td>1900</td>
<td></td>
</tr>
<tr>
<td>LITTLELEAF RAIN SAGE</td>
<td>Lespedeza minus</td>
<td>1200</td>
<td>1200</td>
</tr>
<tr>
<td>BROOM DALEA</td>
<td>Parthenium scoparia</td>
<td>600</td>
<td></td>
</tr>
<tr>
<td>ORANGE ZEKEMIA</td>
<td>Wedelia texana</td>
<td>200-900</td>
<td>600</td>
</tr>
<tr>
<td>FLOWERS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TUBULAR BLUESTAR</td>
<td>Amsonia longiflora</td>
<td>150</td>
<td></td>
</tr>
<tr>
<td>MAXIMILIAN SUNFLOWER</td>
<td>Helianthus maximiliani</td>
<td>900-3000</td>
<td></td>
</tr>
<tr>
<td>INDIAN RHISHPA</td>
<td>Hymenocallis glauca</td>
<td>150</td>
<td></td>
</tr>
<tr>
<td>FENDLER'S PENSTEMON</td>
<td>Penstemon fendleri</td>
<td>300-450</td>
<td></td>
</tr>
<tr>
<td>GRASSES</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SIDEWAYS GRAMA</td>
<td>Bouteloua curtipendula</td>
<td>600-900</td>
<td></td>
</tr>
<tr>
<td>NEW MEXICO FEATHERGRASS</td>
<td>Haplopappus nanumexicanus</td>
<td>600-900</td>
<td></td>
</tr>
<tr>
<td>ALKALI SACATON</td>
<td>Sporobolus asperulus</td>
<td>300-900</td>
<td></td>
</tr>
<tr>
<td>MUNKY GRASS “REGAL MIST”</td>
<td>Muhlenbergia capillaris</td>
<td>450-900</td>
<td>900</td>
</tr>
</tbody>
</table>

![Plant Taxonomy Diagram]

- **FLOWERS**: Antennaria californica, Asclepias californica, Aster amellus, Centaurea Marylandensis, Coreopsis verticillata, Dianthus barbatus, Echinacea purpurea, Eschscholzia californica, Geranium endressii, Helianthus annuus, Hymenocallis glauca, Iris fulva, Liatris spicata, Monarda didyma, Penstemon barbatus, Parthenium scoparia, Rosa multiflora, Silene latifolia, Stachys byzantina, Veronica spicata, Vincetoxicum hirundinaria, Xeranthemum annuum.

- **GRASSES**: Bouteloua curtipendula, Haplopappus nanumexicanus, Sporobolus asperulus, Muhlenbergia capillaris.