

plugfinder.com: Finding and Sharing Electricity in Your City

By: Zackery C. Denfeld

B.A. Policy Studies, Syracuse University, 2004

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School of Art and Design

University of Michigan

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Approved by:

Heidi Kumao, Graduate Committee Chair

Malcolm McCullough, Graduate Committee Member

Mireille Roddier, Graduate Committee Member

Paul Edwards, Graduate Committee Member

Brad Smith, Associate Dean for Graduate Education

Bryan Rogers, Dean, School of Art and Design

Date Degree Conferred: May 2007

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Abstract

The proliferation of mobile electronic technology such as cellular phones, laptops, and lightweight video projectors increases the demand for electrical outlets in public and semi-public spaces. *www.plugfinder.com* is a website that allows people to annotate maps of electricity outlets in their city.

The virtual activity that takes place on the website is accompanied by occasional organized walking tours by the *plugfinder* team. *plugfinder.com* is a project that promotes the temporary use of urban spaces through the creative adaptation of electrical infrastructure.

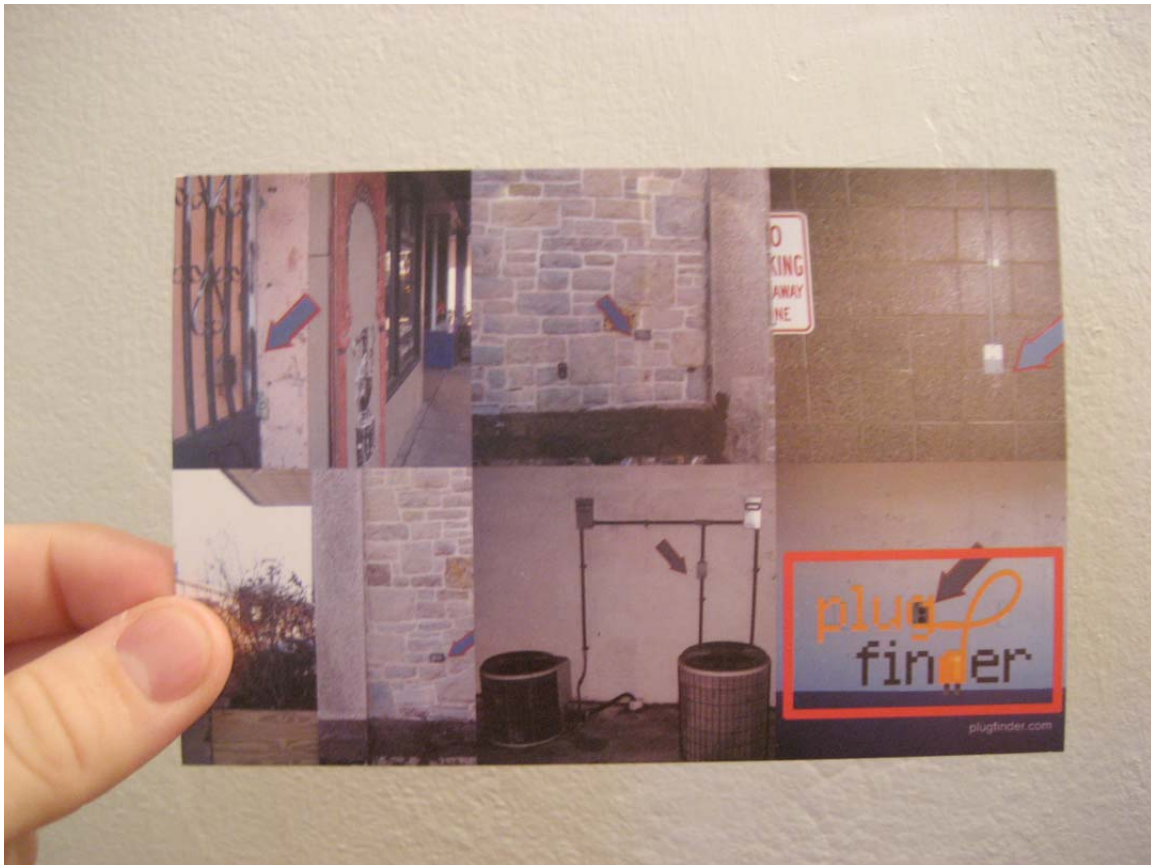
By documenting and facilitating street level uses of electricity, the *plugfinder* project calls attention to the manner in which daily routines and access to resources are defined by infrastructure, bringing to light a little noticed, yet vital, public resource. This paper posits that providing electricity as a public good has the potential to generate social and cultural capital for cities.

This document may be relevant to municipal governments, urban planners or economists in order to prepare for creative uses of electrical infrastructure. The *plugfinder.com* project itself may be relevant to anyone who wants to explore or use space temporarily in the city they inhabit.

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INTRODUCTION

plugfinder.com is a website that allows people to annotate maps with the location of electricity outlets in their city. It encourages users to actively explore their city by locating electrical outlets in public¹ and semi-public² spaces. Users can then post the locations and images of the electrical outlets they find.



The virtual activity that can be viewed on the website is accompanied by occasional organized walking tours of cities by the *plugfinder.com* team. These walking tours intentionally seek to use open electricity outlets as a means of cultural production. On walks that have already been conducted, artists have projected images on the sides of buildings, used electricity to create live

¹ As wikipedia points out “the term Public Space has become something of a touchstone for critical theory in relation to philosophy, (urban) geography, visual art, cultural studies and social studies. Its relevance seems to become more pressing as capital encloses more and more of what were thought of as 'commons' (an idea perhaps best articulated by Marx).”

² For the purposes of this document we will define public space as “a place where anyone has a right to come without being excluded because of economic or social conditions” and semi-public space as the liminal or ambiguous spaces between public and private space such as a sidewalk, an alleyway, an airport or a hotel lobby.

electronic music, and plugged in kitchen appliances in order to prepare and serve food.

Electricity outlets are an example of an interface between humans and large infrastructure. Infrastructure can be defined as “ubiquitous, reliable, and widely shared resources operating on national and transnational scales.” (Edwards et al. 12). When it is functioning well, the pervasiveness of infrastructure allows it to fall into the periphery and become invisible to its users. This project brings infrastructure to the fore and treats it as a topic of creative inquiry.

By documenting and facilitating street level uses of electricity, *plugfinder.com* calls attention to the manner in which daily routines and access to resources are defined by infrastructure. This is especially pertinent in an era of ubiquitous electronic communication technologies.

By advocating a cultural activity that is currently in a legal grey area, this project raises questions about the financing of, and access to, electricity. The project posits that providing free access to electricity in conjunction with urban spaces for temporary use could generate non-fiscal capital.

It is our hope that the use of the *plugfinder.com* website will facilitate people from many walks of life to go outside and participate in their city in new ways, either as active urban explorers, or as users of electricity.

A Short History of *plugfinder.com*

plugfinder.com is an extension of a research project titled *Blue Puddle 1.0*, a web-based mapping project that allowed users to post text and images on city maps.

Blue Puddle 1.0 was produced at the University of Michigan’s Grant Research Collaborative Spaces (GROCS) Lab in the first four months of 2006. *Blue Puddle 1.0* was a collaboration between Brent Fogt, Kyle Mulka, Nika Smith, and Zack Denfeld. The faculty advisors for this project were Prof. Mireille Roddier and Prof. Nick Tobier. The GROCS lab is run by Linda Knox.

The successive projects, *Blue Puddle 2.0* and *plugfinder.com*, are collaborations between Zack Denfeld and Hawker and Shill, a new media design collaborative, and were begun in October 2006.

The *plugfinder.com* project is ongoing. This paper covers the project’s development through April 10th, 2007.

The website itself (accessible at <http://www.plugfinder.com>) is a dynamic database-driven site built using the open source DRUPAL software platform. DRUPAL is a Content Management System (CMS) that describes itself as 'Community Plumbing'.

Users for *plugfinder.com* are being cultivated by distributing how-to videos through YouTube (<http://www.youtube.com>). Occasional guided walking tours by the *plugfinder* team and others, enact the plans and ideas that are generated in the online discussions of the *plugfinder* community. Denfeld and Hawker & Shill are also blogging about the project, and collecting stories and images from people about the creative use of electrical infrastructure at <http://www.plugfinder.com/blog>

CONTEXT

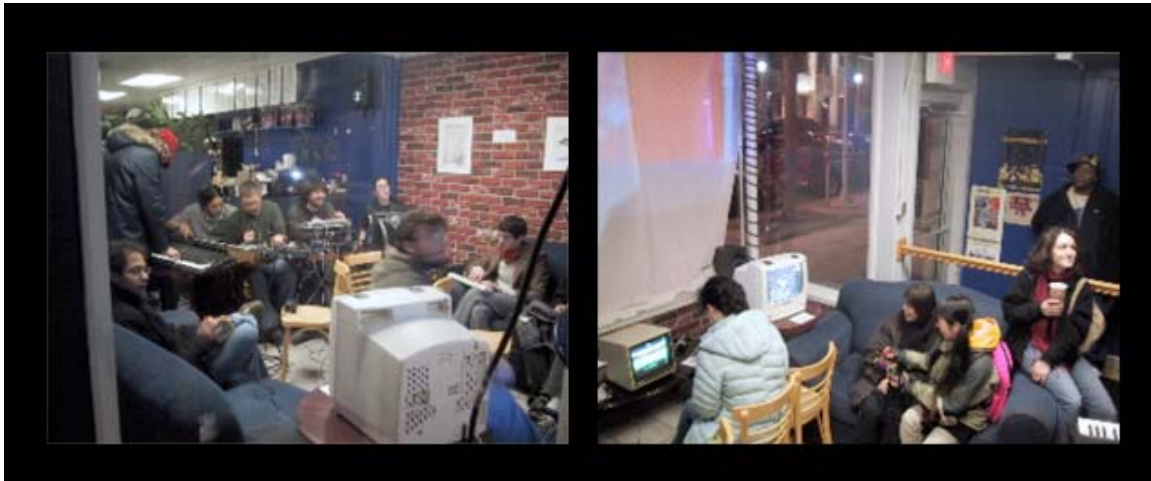
The Plugfinder project is a culmination of various creative work I completed while a student at the University of Michigan. Early experiments in video and new media were combined with guided walking tours and research into locative media. These various threads form the context for my Thesis project.



The Unfuckin' Governable Party. VJing by Zack Denfeld and Leslie Raymond. (2004)

I entered graduate school working as a Video Jockey (VJ). As a VJ, I improvised with live video projections as a means of telling a story, evoking an emotion or otherwise shaping the mood in an architectural space. Live music or a DJ often accompanied my projections.

One VJ show that I organized at a local coffee shop used simple 8-bit video games as inputs into a large audiovisual system. As audience members played these video games, a crew of VJs and DJs cut, pasted, and mixed the sounds and images coming from the video game consoles and rebroadcast them in the space. This project was an early attempt at giving audience members some level of agency into what was ultimately displayed by the ‘artists’. A similar attempt at distributing authorship in a live media environment was a project called *d4D*, which used sketches created live by the audience as inputs for the VJ mix.



8-Bit Archetypes. A video game VJ remix party at Ambrosia Coffee House. (2005)

Simultaneous to my VJ work, I helped set up events at a site called Twitch Microcinema³. The physical location of Twitch Microcinema was an alleyway leading to a parking lot behind my friend Vinh’s apartment. Beginning at sundown the parking lot emptied out of cars. At Twitch Microcinema, we screened alternative international and local film and video work.

In order to power the video projector and stereo system used for screenings, we ran an extension cord into the alleyway near my friend’s apartment. We plugged the extension cord into an electricity outlet that was on the outside of the University of Michigan’s Lane Hall. This is an example of what Haydn and Temel call an interim use, a place “where there is a gap in the cycle of utilisation, which can be used in the short-term for other purposes, usually not with purely economic motives” (12). In this case, the gap in the cycle of utilization consisted of cars leaving the space after dark and an unused electricity outlet on the outside of a building.

³ Wikipedia defines microcinema as “a mode of low-budget exhibition—a small theater or screening series operated in order to show small-gauge filmmaking, artists works, shorts, and repertory programming.”



Twitch Microcinema. A screening of work by the Discount Video Collective. Note the location of the wall that is being projected onto in the map. (2004)

Twitch Microcinema was my first use of outdoor electricity outlets as a means of distributing cultural material. I was amazed at the diverse groups of people that would attend the screenings and the temporary communities that formed during the events. The great experiences I had in this space motivated me to choose the subject of electricity and temporary uses of space as the topic of my thesis. How might a city be transformed if every neighborhood held a weekly microcinema? Were there other gaps in urban cycles of utilization that could be filled in by using open electricity outlets?

The Headmap Manifesto

In the fall of 2004 I was a Graduate Student Instructor for *Art & Design Perspectives 3: Technology and the Environment*. One of the challenges of the class was to think about how the rise of information and networking technologies could affect the built environment. I learned about artists who were using locative media to creatively “increase access to geographic information, add flexibility in filtering and presenting it according to activity and challenge us to annotate sites less obtrusively” (McCullough).

Prof. McCullough pointed me to the Headmap Manifesto that similarly promoted moving away from

the 'inside' view that developed after the failure of the space programme, the closure of the frontiers, the rise of television, early computing, interiorised simulation and drug culture...

...towards an outside view – a recolonisation of the real world, computers becoming invisible, mobile, networked and location aware, the real world augmented rather than simulated (1).

Inspired by the proliferation of these geolocative technologies, the writers of the Headmap Manifesto made the following utopic claims: "What was once the sole preserve of builders, architects and engineers falls into the hands of everyone: the ability to shape and organize the real world and real space" (2). And "The Internet has already started leaking into the real world. Headmap argues that when it gets truly loose the world will be new again" (1). They believed that the diffusion of cartographic authorship would profoundly change the relationship between humans and the built environment in which they inhabit.

Depressed on the eve of the U.S. presidential election in 2004 and under the sway of the Headmap Manifesto I wrote my own manifesto:

Blue Puddles

11/5/04

I propose that Ann Arbor become the home of the Blue Puddle International: 24-hour party town that put politics in the service of art. If you feel like a puddle of blue in a sea of red or just someone who is willing to drop the corporate media onslaught in order to build something better, get in touch.

The Blue Puddle International Manifesto:

We demand that public spaces be erected and protected. We demand that chance encounters between varying social groups are promoted and ensured in all urban design and that no one is allowed to reinforce his narrow worldview by erecting gated communities. We demand that cities are explored and not consumed. We will make maps and lead tours. Learning needs to spill out of the classroom and into the streets.

Kids, don't wait for the old generation to take you there, they can't even vote right.

How do you become invisible?

First of all lose, your name, and make up three more. In the 21st century, everyone who is sane will need a few handles they can drop in and out of.

Be like the ninja who learns “how to shorten distances by shrinking the earth (Nam June Paik).” Continue to create our own roads and paths within and outside the World Wide Web traffic jam. The war for information democracy is being fought and won in our own backyard. Keep the tags and stickers coming. Make hobo signs with chalk for everything useful to citizens as opposed to consumers. Let’s paint bikes white and leave them everywhere like the Dutch Provos.

Let’s have flash mob-generated, city-wide costume holidays. If half the kids in your class showed up in costume everyone, can at least rejoice in the upside-down world we live in.

Make solutions to problems that don’t exist yet. I believe that engineers should not have to make weapons in order to survive. Let’s erect sculptures of Buckminster Fuller and inflatable buildings on North Campus. Let your engineering friends know that you want them to make stuff that is fun, silly and self directed. They shouldn’t have to make weapons of death for governments. How about weapons of self defense for citizens facing the information onslaught? The recent invention and release of TVBGone, which turns off any annoying TV, is a good example of an engineer helping citizens take control of their mental environment.

We insist that educators teaching design and engineering classes challenge students to begin projects that have no commercial value. Insist on design that does not make interactions more controlled, but more liberating.

Right now, designers make benches for malls that prevent people from sleeping on them or from sitting too long. Who designs benches for parks that are intended for people to stand on and give speeches? Who designs for spontaneity, freedom or reflection?

No one makes money from humans reading books or reflecting in public spaces. Who will ask the hard questions if not our universities? Who will pay for design that benefits human autonomy if not public institutions of higher education?

If shopping malls have replaced town greens and parks as the primary areas of interaction, gathering and discussion, let’s bring public activity to them.

We can go to Radio Shack and start an electronic drum circle with the keyboards. Bring movies you’ve made that won’t be screened anywhere else and put them in the TV monitors and VCR units that only spit out commercial messages. Go to Hot Topic or anywhere else that co-opts and packages youth culture and host a zine release party inside or in front of the store. And make sure to text message me an invitation.

Date the sons and daughters of the evil empire. Have so much fun and spread so much love on the parks in the streets and over the airwaves, they would never think about continuing the commercialization of every square inch of our world, because they want to make out in the bushes, yell from the rooftops and draw on the sidewalks. Organize an Ann Arbor lay-in on the Diag in sleeping bags and look at the stars at night. Talk about the meaning of life. I’ll be there even if it is raining.

Take your damn iPod and turn every block into a short-wave radio station. Put the station frequency on the street signs. We'll drive around the city with your audio as our guides.

We will continue to work toward economic, social and environmental justice. But in addition, and in conjunction, our spirits need to be fed, inspired and revived.

The Blue Puddle International movement seeks to start a 24-hour situationist party in town. We will make this art-life party so dense and powerful that one drop of blue zaniness into the red storm will turn it from upside down to right-side left. Export the revolution locally/globally. And don't forget... have fun, be silly and make noise!

Looking back now, I find sections of this text to be naïve and just plain silly. Some parts still strike me as relevant, now more than ever. Manifestos don't often hold up over time, but they do provoke new thoughts and actions. The manifesto served as a blueprint and a source of energy and inspiration for my creative work over the next year. With the manifesto in mind, I took action by giving walking tours, putting up stickers and chalkings, and creating temporary urban situations.

Take a Politician for a Walk

In the summer of 2005 I did a piece called *Take A Politician for A Walk*, with the goal of explaining my views on cultural capital to an elected politician. I held a party for city councilwoman Jean Carlberg in an art gallery in downtown Ann Arbor. I served food, and citizens were invited into the art gallery to eat and to talk to their elected official. Before the party, I took Ms. Carlberg on a guided walking tour of the graffiti in the alleyway behind the gallery.

The piece was a riff on Joseph Beuys' 1965 work, *How to Explain Pictures to a Dead Hare*. Originally the piece was called, *How to Explain Cultural Capital to a Bean Counter*. It turned out that Ann Arbor city councilwoman Jean Carlberg was very receptive to my idea that street art was a good barometer of the cultural capital of a city, so I changed the title to the less mocking, *Take A Politician for a Walk*. We spent a lot of time looking at collages that were wheat-pasted up by the street artist GARY and compared them to the work of Robert Rauschenberg.

Take a Politician for A Walk differed from my work as a VJ because I did not use electronic media to shape a space. I used the more immediate tactic of physically moving and talking about a place to understand it in a new light.



Take A Politician for A Walk. Zack Denfeld and city councilwoman Jean Carlberg discuss a wheat paste by the street artist GARY during a guided walking tour. (2005).

I was very excited about the immediatist tactics of walks and parties and wanted to combine these with what I had learned about locative media. Geotagging, adding geographical information to online content, was still a relatively new phenomenon.

In addition to doing walks and performances in the city, I wanted to build on top of the newly released GoogleMaps software to create a system of urban markup language in order to “invite many more people to become authors and producers, and offers many more filters for those who remain consumers” (McCullough).

In the same way that graffiti reflects the voices and dreams of citizens that are not captured by architects, it was my hope that geotagging might similarly allow inhabitants to author places into existence.

LITERATURE REVIEW

An Explosion in Maps

There has been an explosion of mapping and locative technologies in the last decade. The availability of GPS, RFID, GoogleMaps and other consumer-grade technologies has increased the number and sophistication of mapmaking tools at the disposal of ordinary citizens.



Garbagescout.com – “Features maps and photos, submitted by the public, of recyclable and reusable items found awaiting trash pick-up on New York City streets.” Garbage Scout was one of the early Google Map mashups that served as an inspiration for *plugfinder.com*

GPS⁴ In May of 2000 the Clinton administration removed the deliberate blurring of the Global Positioning System (GPS) so that civilians had the same level of accuracy that the U.S. military previously enjoyed (Monmonier 15).

⁴ Note: In the spring of 2006 the University of Michigan purchased a very expensive GPS-enabled camera for the *Blue Puddle 1.0* research group to use. It is now housed in Checkout Point Charlie in the

GOOGLE MAPS Google Maps, the free web mapping service, was first announced on February 8, 2005 (Wikipedia). Beginning in 2005 users began creating Google Maps ‘mashups’. *plugfinder.com* primarily relies on the Google Maps technology. In future iterations *plugfinder.com* can easily be adapted to accept GPS enabled camera phones as a means of inputting information into the database.

RFID Radio-frequency identification (RFID) tags “allow the tracking, sorting, and self-identification of items they’re appended to” (Greenfield 98). Adam Greenfield suggests that “the fundamental characteristic of an RFID tag is *cheapness*,” and industry sources foresee a massive drop in price, making it “economic to slap tags on just about everything” (99). Human artifacts and living things become trackable in S**P**ace and in real t**I**ME⁵.

These locative technologies in conjunction with the already existing networks of mobile information and communication technology have democratized cartography, allowing for bottom up and many-to-many models of map creation and distribution.

In *On Urban Markup: Frames of Reference in Location Models For Participatory Urbanism* Malcolm McCullough explains the intersection of annotated maps and mobile computing:

Inscriptions have characterized almost all cities in history. Whether as grand expressions carved in stone facades, mundane signage in the streets, or in the various props used by communities of practice, an information layer has shaped urban experience. Now that layer intensifies. Much as electrification did for power infrastructure a century before it, pervasive computing brings mobility, precision, personalization, and embedding to urban annotation.

Duderstadt Center on the University of Michigan’s North Campus. By the time you are reading this, there is a good chance that location aware picture phones are ubiquitous, and our clunky GPS camera will seem quaint.

⁵ See Bruce Sterling’s *Shaping Things* for more information about SPIMES

Blue Puddle 1.0

In the fall of 2005 I wrote a grant application for a project called *Blue Puddle 1.0* in order to test out the abilities of these locative technologies and to try to create an instantiation of information urbanism.



Blue Puddle 1.0 This photo is a shot from BluePuddle 1.0 front page circa April 2006.

The original team consisted of:

Brent Fogt // School of Art & Design
Kyle Mulka // School of Engineering
Nika Smith // School of Information
Zack Denfeld // School of Art & Design

The original grant proposal stated:

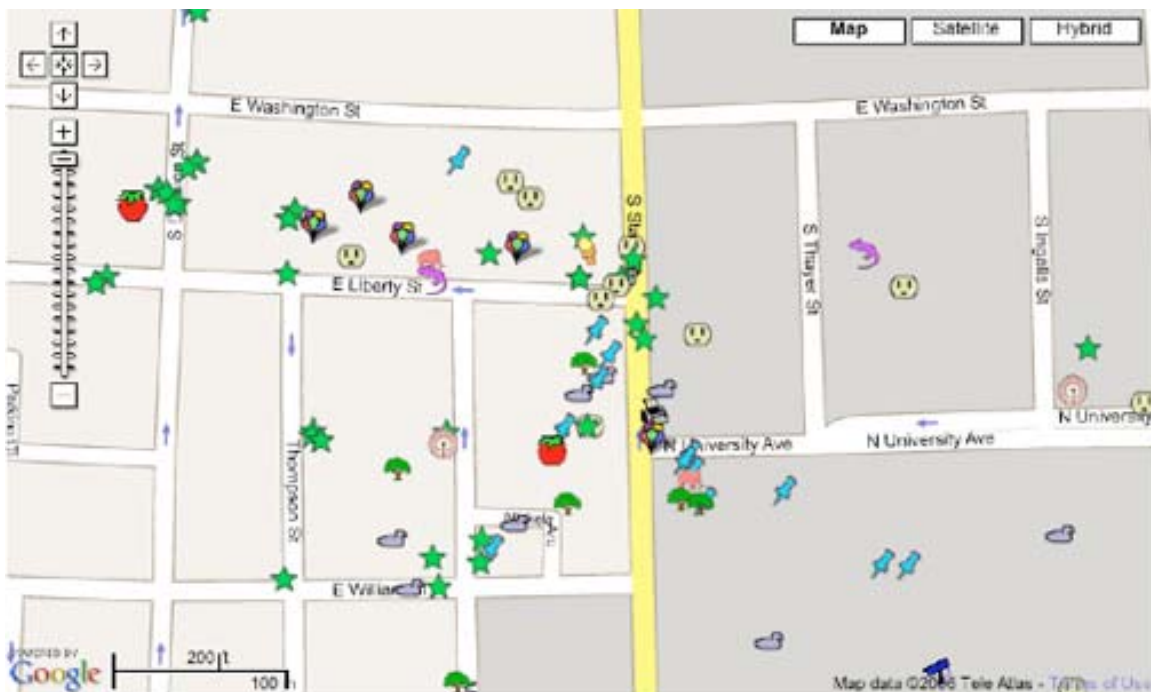
Blue Puddle is a web based software application that allows users to post text and image information about specific real locations in a city on areas of a city map. Organizing the information spatially gives users a tool to explore and understand the built environment, and captures the personal landmarks, forgotten histories and illegitimate art (graffiti) that are not contained in the maps that are used purely for way finding or navigating.

Users will be able to tag their entries with specific Latitude/Longitude data if they have GPS devices, or simply point to a space on a map similar to

google.maps or other interactive map software. This allows users multiple ways to geographically place their entries about a place.

Although the software will allow users to curate particular tours, the distributed authorship that comes from many users with many interests allows stories and maps of the city to emerge that are more rich than any single author could create. Additional features may be rolled out as the project progresses such as commenting or rating particular entries, or asynchronous communication such as message board style thread to be developed on particular entries.

Blue Puddle was an attempt to integrate some of the traits of a dense urban environment into the way that information was displayed and accessed on a map. To simulate this, the map in the *Blue Puddle* project was designed to be dynamic and rich with the geotags of many different authors.



In the screenshot of the finished project each icon represents the geotags of one user. The user-modified database creates dynamic maps on the fly. Each time you visit, the map the experience is slightly different. A small subset of the total information in the database is shown and different users' ideas mingle and bump into each other on the shared space.

Working on the project from January to April of 2006, we created a working prototype of a mapping website. Although I was excited about the potential for the project, this first iteration did not meet my expectations. The technology worked but it hadn't fostered the kind of interaction of diverse information that was had hoped for. It was not set up in a manner to solicit personal or anomalous cultural content.

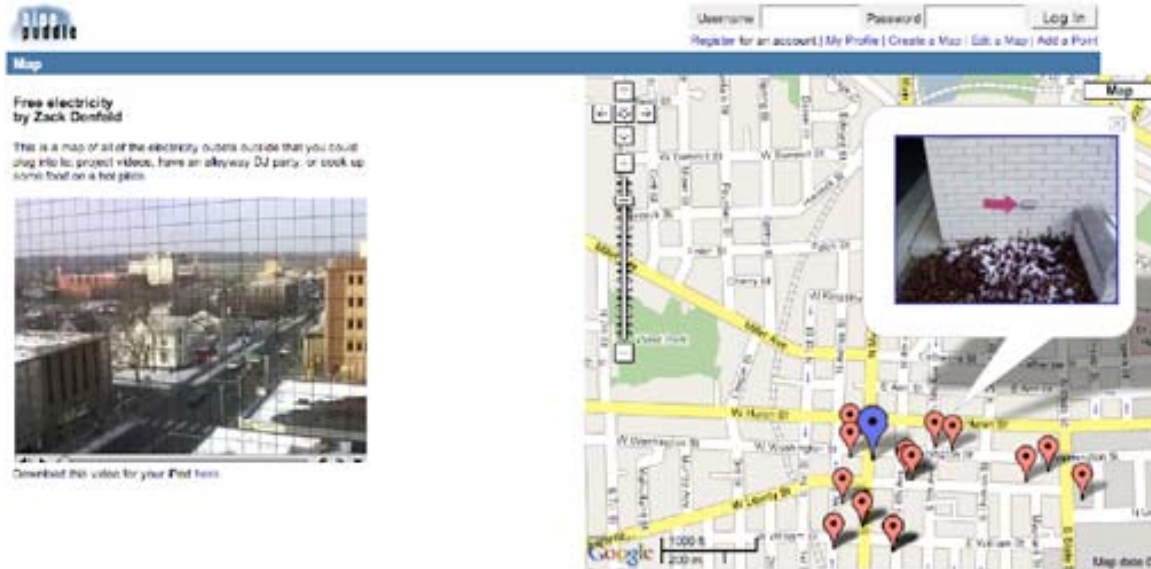
Upon reflection, I realized that the scope of our project was too large. There were two major principles that guided our design decisions: the website had to be **easy to use** and **many users' information would be present** on the same map.

But what would people map? Without any cues or parameters, it turned out that people were at a loss of how to respond. They often annotated their favorite restaurants or coffee shops. Only occasionally did users post something more anomalous, like a good tree to kiss under. This was the kind of peculiar personal content that caught my attention. This is the kind of subjective individual experience of the city that would make information urbanism viable.

During the months that we worked on the project, two websites appeared. *Platial* and *Wayfaring* became popular sites for the every person to create complex personal maps using GoogleMaps. *Platial* and *Wayfaring* had established large user bases and our software did not really offer anything different than either of these tools. With only one dedicated programmer on our project, there was no way we could compete with these other projects.

Although the *Blue Puddle* project was a great learning experience, I wasn't satisfied with the outcome. I still saw potential in interactive mapping technologies, but if I wanted to do another iteration of this project I would have to figure out a more specific topic to map.

When the *Blue Puddle* team finally finished an operable map, the first thing that I did was annotate all of the electricity outlets on the outside of buildings. I enjoyed participating in Twitch Microcinema and I wondered if there were other spaces around town that people might use to project movies or do live VJ events.



The online map from Blue Puddle 1.0 that showed electricity outlets in downtown Ann Arbor.

In the map of electricity outlets, I embedded a video explaining the process of identifying the outlets. Video transcript:

Zack: Blue Puddle is a form of urban exploration, going around out cities, seeing the interesting parts we don't usually get to see. So, for example, the infrastructural elements, the long thin alleyways, that no one goes into much but that are a part of the city. So today, actually, all I brought with me is this light-bulb on a strand that we can plug in to test power outlets , a red arrow so we can take a photograph pointing to where the power outlet is, and a GPS enabled camera. And what we are going to do today is map out all the "free" electricity sources downtown. I think a lot of people would use this information to do interesting things. I think part of the fun of this is just going out there and seeing your city in a way you don't usually get to see it. You are looking hard for little things that you don't usually do, but you get to really know the characteristics of your city.

I had a personal interest in electricity outlets and how they could facilitate temporary activity in urban spaces. Everyone I spoke to about the project seemed to think there was a need for a free electricity map, if only to recharge their phones. For the next iteration of *Blue Puddle* I created a map that used electrical infrastructure as its departure point.

Infrastructure

I want to live in a city built for humans not automobiles.

I want to live without dead time.

I want to live slower not simpler.

I have chosen a form of infrastructure as my topic of inquiry because infrastructure sets the boundaries for how humans can interact and communicate with other humans and non-human actors. In *Understanding Infrastructure*, Paul Edwards et al. write that in some cases “discrepancies between the assumptions of the designers and expectations of users have caused infrastructure to be questioned, opened up, and subjected to ‘user revolts’ that have challenged, undermined, or in some cases improved upon, what had previously been regarded as elegant technical solutions” (28). In this project, the assumptions about where and how humans access electricity is being called into question.

Our research of electricity use⁶ shows that small discrepancies already exist between user expectations and the design of electrical infrastructure in locations such as airports and coffee shops. *plugfinder.com* is a tool that can foment further user revolt.

User revolt forces infrastructure designers to incorporate flexibility and adaptability of new uses into their designs. More flexible electricity infrastructure will be a positive development especially if it shifts the focus away from cities designed to facilitate the circulation of personal automobiles and towards cities designed to circulate humans and their gadgets. A city designed for the pedestrian and their gadgets can be considered a form of inhabitable circulation.

In *Crepuscular Dawn*, Paul Virilio makes a distinction between mobile architecture and inhabitable circulation. He writes “The car is also a form of mobility that was going to inspire the English Archigram’s ‘Walking City’,” a precedent mobile architecture which Virilio critiques because “In a car the body is dead” (38). On the other hand, inhabitable circulation has “topology, choreography, and the return to the body” (38). McCullough makes a related critique lamenting the loss of place and writing, “the emphasis on hardware that is stylishly worn or carried neglects its counterpart that is invisibly embedded into a site.”

Virilio’s notion of inhabitable circulation implies embodiment and interaction. Instead of small mobile units that promote individual isolation, inhabitable

⁶ See *Case Study One* and *Case Study Two*.

circulation implies crossovers, and opportunities for chance encounters. Virilio states, “the model of architecture is Nietzsche’s dancer. The model that I used to admire was the ‘interchange’.”

What facilitates inhabitable circulation is interchanges; places of cross over. Electrical outlets in public places are points of interchange. By plugging in a video projector or an electronic instrument, electricity is converted into communication.

The study of interchange, or places where infrastructure cross over, is important because in the utopic discourse surrounding the explosion of location-aware technology, no one has adequately addressed the fundamental question of electricity.

Many of the visions of the information nomad that date back to Archigram, the forward-looking British architecture group, seem to ignore all of the cords that recharge the batteries on our mobile devices. If we are going to move towards a city of information nomads that inhabit circulation we will need places to plug in. So far, coffee shops have embodied the refuel station topology, where humans, and the layers of mobile technology that humans wear, can go to recharge.

Coffee shops are not the only places that people go to congregate and plug in their devices. As discussed previously, I was involved in a temporary community that shared electronic media in an alleyway. This site was chosen because it did not require a rental fee, it was not being used for its primary purpose (storing automobiles), and because it was an opportunity to watch movies while sitting under the stars.

The electricity available on the outside of Lane Hall was converted into a medium for communication because there was also a huge wall for projecting and two walls that closed off the space from a busy intersection. An alleyway was turned into a place that people could walk to and share electronic media. Twitch Microcinema was a point of interchange where electricity was converted into light and sound.

So, why is it that buildings have electricity outlets on the outside, anyway?

Law, Codes, and Standards

In the United States the National Electric Code dictates whether buildings are required or allowed to have outside electrical outlets. Some sections of the code require building plans to include outlets for safety reasons or expected uses. Architects can also choose to add in as many outlets as they want on the

outside of the building as long as those decisions don't violate other codes (Baker).

Although sections of the code requiring outlets on the outside of buildings were put in place for safety reasons, these have the unintended consequence of making buildings more adaptable. In his book *How Buildings Learn*, Stewart Brand suggests that buildings are “*designed* not to adapt” but they “adapt anyway, however poorly, because the usages in and around them are constantly changing” (2). When writing about the service layer of a building such as electrical installation, Brand writes, “many buildings are demolished early if their outdated systems are too deeply embedded to replace easily” (13).

He also demonstrates the failure of attempts at making buildings ‘smart’:

“The ‘smart building’ boomlet of the early 1980s was based on the idea of electronically integrating all the control of the systems of a building *and* offering tenants a full menu of built-in information services. Both failed. ... There was a contradiction at the heart of the idea, according to Steve McLellan, a telecommunications regulator in Washington state ‘We found that any user sophisticated enough to seek out a ‘smart’ building was also sophisticated enough to home-brew a more flexible system.’ Tenants universally preferred to install their own communications systems” (171).

Edwards et al. strike a similar note emphasizing the importance of change and adaptation. He writes, “infrastructures are incremental and modular, they are always constructed in many places (the local), combined and recombined (the modular), and they take on new meaning in both different times and spaces (the contextual)” (7).



The corner gas station had an icebox on the outside of their building. The outlet around the corner powered it.

Sometimes the adaptation may be a temporary fix until the owner can carry out a more substantial remodeling. An example would be the icebox at the gas station down the street from my home, which has been plugged in as a quick fix. From the looks of the drooping cord that snakes around the corner of a building, this is a temporary solution that would probably not meet safety codes. Until an inspector catches the gas station or a more permanent solution can be found, this is how it will remain.

Unlike the high-tech services provided in “smart buildings”, access to electricity is a foundational service that will not become obsolete anytime soon. Flexible and complicated service systems can be built if electricity is available. In other words, buildings learn through adaptability, from incremental bottom up adaptation not from prescribed top down solutions.

However, the fact that these outlets are on the outside of the building creates the possibility that people other than owners or inhabitants will use them adaptively as well. In the early stages of research for this project, I took a picture of a meter maid using her laptop while waiting in a car.



At first I was surprised by the audacity of a municipal employee who would plug into a private building and “steal” electricity. After thinking about how electricity is accessed at places like airports and coffee shops, I realized that the adaptive use of outdoor electricity outlets is not surprising, and it is only bound to increase. Unless we want to criminalize meter maids on breaks, or white-collar workers at airports, we need to rethink how and why spaces with electricity outlets are used.

Is plugging into an electricity outlet on the outside of a building (that one doesn't own) stealing? *A Tale of Two Outlets* might give us some insight into why this question is more complicated than it seems

Case Study One: A Tale of Two Outlets

Scenario One: While in New York, I called a friend on my mobile phone. She was going to be in Midtown so we decided to meet in Grand Central Terminal because it is a well-known landmark. While waiting for my friend in the downstairs lobby I noticed that the battery on my mobile phone was almost dead. I looked around and saw other travelers with their laptops and mobile phones plugged into outlets, so I pulled out my phone charger and joined the crowd. Twenty minutes later, my friend met me, and we walked to a bar a few blocks away.



Grand Central Terminal. New York, NY. (2006)

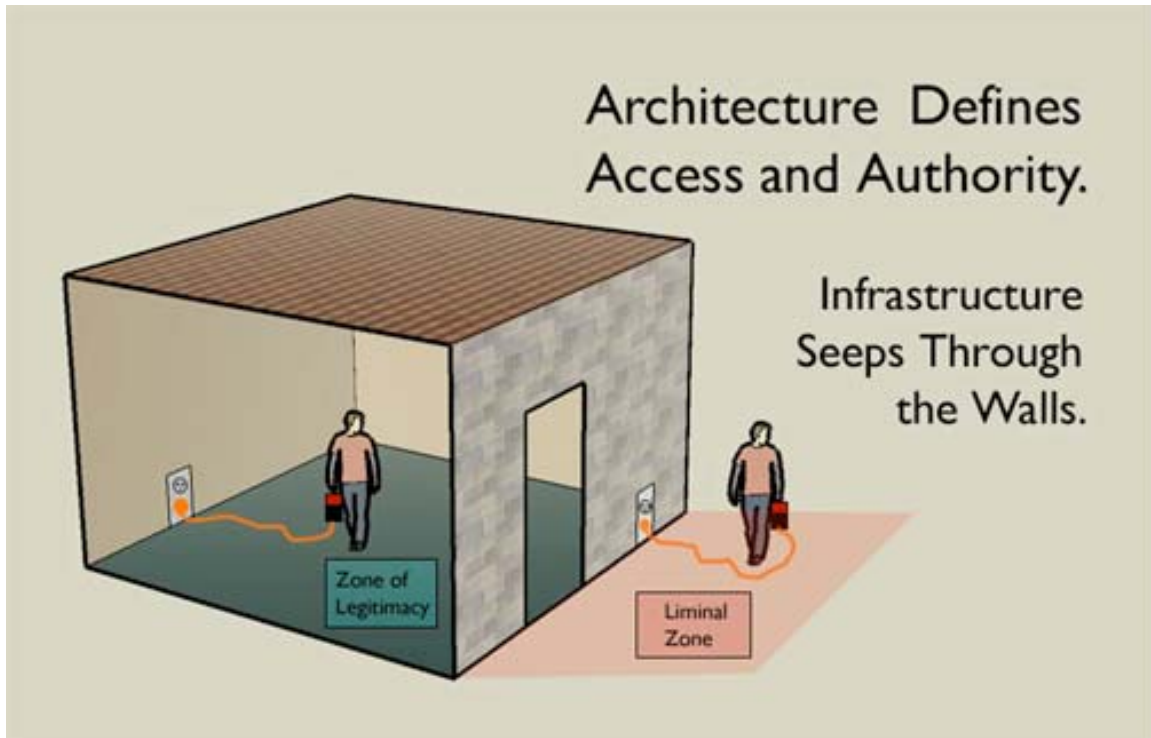
Scenario Two: While walking back from the grocery store to my house, my mother called me on my mobile phone. Her voice sounded urgent, but before I could hear what she had to say to me, my phone died. I was standing right outside of Eastern Accents Bakery where I buy my coffee, breakfast, and do word processing on most mornings. There was an electricity outlet by the window on the outside façade, so I set down my bag, leaned against the wall, plugged in my phone, and returned my mother’s call.



Eastern Accents Bakery. Ann Arbor, MI. (2006)

What distinguishes these 2 scenarios? In the first, I felt totally comfortable recharging my phone, while in the second I felt slightly awkward. I had not spent a penny in or around the Grand Central terminal, but I was reassured by the fact that I was in a semi-public space used by people in transit, and saw other people re-charging their devices. Grand Central Station is a good example of inhabitable circulation in action.

In the second case, I felt awkward even though I buy food from the restaurant almost daily, and usually sit with my laptop plugged in while I eat my breakfast. Surely, borrowing half a cent of electricity during this extenuating circumstance was not unjust. In this case, being on the other side of the wall is what made me feel awkward.



Architecture Defines Access and Authority.

This diagram shows how some infrastructure dissolves the traditional meaning and value of walls. Walls divide space and keep some people in and other people out. To access the 'stuff' in a room, one needs to pass through a threshold. Putting up walls is one way of limiting access.

Wireless internet is one example of an infrastructure that seeps through the walls because of its immaterial nature. Electrical infrastructure is less obviously permeable compared to wireless technology. However, the legal mandate to have access to electricity on the inside AND outside of a building allows electricity to behave like wireless internet access and dissolve the ability of walls to limit access.

Case Study Two: Airports Are Places to Watch

To get a sense of what an Inhabitable Circulation City of the future might look like, I researched airports. In airports, electricity outlets dictate traffic patterns. People sit on the floor, or lean on garbage cans, or in other precarious positions, so that they can access electricity for their gadgets.

Airports are good predictors of future behaviors because many travelers have multiple gadgets such as mobile phones, laptops, .mp3 players, etc. that need to be charged.

However, airports are increasingly inhospitable to this type of behavior. It seems that the administrations of transportation hubs have decided that using their electricity without paying is not allowed.

Most travelers have grown accustomed to the availability of free electricity in airports. However, there are indicators that airports are trying to pass this cost on to travelers and move available electricity from a public good to an on-demand privatized service. Understandably, some travelers are upset. I have observed two tactics in which airports have tried to pass the cost of electricity on to their consumers.

Scenario One: Chicago's O'Hare airport has installed branded kiosks that provide seating, desks, and electricity outlets. Above this installation is a billboard with the text:

*Low on Power? Get a FREE Charge.
Sponsored by the City of Chicago and ClearChannel.*

The tactic here is to convince the user that he/she is receiving a special privilege. Looking more closely at this scene, however, one observes a woman talking on a mobile phone that is plugged into a wall outlet. What the kiosk users are accessing is not FREE electricity, but the privilege of sitting at a workstation off the ground.



O'Hare Airport. Chicago, IL. (2007)

So the question becomes: WHAT is being sponsored by the City of Chicago and Clear Channel? Since they are not sponsoring the outlet to the right of the kiosk they must be sponsoring the table and chairs. While it's a nice gesture, I am happy to have the choice not to sit at their table, thereby showing my disdain for Clear Channel's unrelenting push towards media consolidation.

It is likely that municipal airports will seek more corporate sponsors for the

billboards above these kiosks. Profits earned and partnerships deepened from these sponsorships help to justify letting passengers use electricity that was previously given out for 'Free'. Airport security might criminalize the use of non-branded outlets forcing people to sit at the outlets that corporations have approved. In the future, it is likely that branded outlets will become ubiquitous in airports, and unbranded outlets will be hidden, uninstalled, or shut off.

Scenario Two: A second model for airports to profit financially from the use of electricity is the pay-for-play model. In this model the traveler pays money to activate an electric cable. In the *ChargeCarte: Rapid Charger* the traveler is charged \$3.00 for 30 minutes of electricity. Because there are so many different standards of electricity plugs for our gadgets, this particular model of pay-for-play works.

The proprietary delivery systems of different phone and .mp3 player companies makes it impossible to recharge your item if you have lost the particular cord for that device. This machine exploits the large range of electricity delivery systems. Users will be inclined to use it if they do not have the proprietary plug with them. iPod users are particularly vulnerable because many models of iPods can only be charged through the USB ports of laptops. If you do not have your laptop with you, than you cannot recharge your iPod. The *ChargeCarte* machine provides the service of having all of those proprietary plugs available.



Portland International Airport. Portland, OR. (2007)

Literature Review: Conclusions

We could be moving from urban spaces designed around the needs of automobiles to urban spaces designed around the needs of our mobile gadgets. Cities will want to make plans accordingly. This document can be read in preparation of designing a city that is a form of inhabitable circulation. A good design strategy would be to place electricity outlets all over the city and allow citizens to legally use them as they pass through the city.

There are at least two possible methods for financing access to electricity in public and semi-public spaces. Electricity might become a demand responsive service. People might be willing to pay for the privilege for accessing electricity on demand in places outside their home. The Charge-carte now found in some airports around the country is an example of this.

In contrast, electricity could be treated as a public good, as it has traditionally been treated in the airport. Imagine a park with a huge wall. Instead of spray-painting graffiti, kids might project their names as animations using the fancy code they wrote last night. Perhaps people gather, plug in, and project the latest viral video on the space, thus transforming this wall into a gathering space for sharing electronic communication.

Further research into the value of electricity in creating inhabitable circulation is needed. People using *plugfinder.com* and using electricity outlets for cultural production will help others interested in this topic understand the value of electricity as a public good.

DESIGN RESEARCH

In this section I discuss the transition from *Blue Puddle 2.0* to *plugfinder.com*. I highlight how some of the important design decisions for the final project were made.

Blue Puddle 2.0



Things to do With Free Electricity. Digital Sketch. (2006)

Upon starting the development of *Blue Puddle 2.0*, I brainstormed about some of the possible uses of electricity outlets on the outside of buildings.

ImageBombing, e-graffiti, and cinema were all related to my previous practice of

VJing because they used projected images to change a space. *Iron Dumpster*, a cooking competition I organized used food rescued from the dumpsters of supermarkets. Prof. Rebekah Modrak's fashion remixing events involved setting up sewing machines and basic tool sets where people could bring their old clothes and drop them off. Artists would take these different clothes and recombine them into new outfits in an improvisatory manner. I wondered if these events could be held just as easily in alleys and parking garages, as opposed to art exhibition spaces.

Collaboration with Hawker and Shill

Because the funding for the *Blue Puddle 1.0* project had finished, the original team disbanded. I was still not a proficient enough programmer to create a database-driven website on my own.

I contacted Vinh the primary organizer behind Twitch Microcinema and his new media design group, Hawker & Shill agreed to work on the project. They were willing to work on the project pro-bono, in part because it was an opportunity to build new skills while collaborating on an innovative project.

We decided to use Drupal as the programming back end of our site. Drupal is an open-source content management system with a platform that allows easy remote collaboration. The other advantage to using Drupal was the existence of a very active online discussion community with extensive forums for technical help. We hoped that by posting on the forums and making some of the code we created available, we would contribute to that community as well.

We changed the name of the project from the cryptic, *Blue Puddle 2.0*, to the more self-explanatory *plugfinder.com*.

Uses

The Graffiti Research Lab (GRL) is a group that has used urban infrastructure, in public or semi-public spaces, as a means of cultural production. Their well documented website provided a good list of the types of projects that artist / hackers / engineers might leave their labs and galleries to create.



Throwies. By the Graffiti Research Lab. (2006)

I first discovered this group through their *Throwies* project, an improvised light graffiti that consisted of a magnet, a battery and some LEDs in small throwable packages. What I liked about this project was that it was temporary and situated, and it was bottom-up. It was a way for citizens to spontaneously reconfigure the city they inhabited, temporarily.

I like the way that the project was disseminated as well. The Graffiti Research Lab did not just make the *Throwies*, and use them for themselves. They also distributed the plans for building them freely by producing how-to videos, publishing text instructions online and teaching people to make their own *Throwies* in workshops.

One criticism I had with the project was that the batteries might remain stuck to the wall even after the LEDs stop working. This project was not designed for

disassembly; it assumes that the *people who put them up, or some other party will collect the Throwies*. (Maybe the building owner?) There is no built-in mechanism by which the batteries would be recollected.

Although very small, the leftover batteries might pose a potential health risk. Similar to graffiti made with aerosol cans, *Throwies* may increase citizen participation in the meaning of the city, but they may decrease the environmental health of the city. However, GRL does provide a link on the *Throwies* page that says, "[Click this link](#) to find out more about how and where to properly dispose of lithium batteries in your area," indicating that they are aware of this unresolved problem with the project.

The Problem with Batteries

This brings us to the larger problem with batteries. New media designers and artists are creating mobile computing scenarios that depend upon battery operated devices such as mobile phones. Since batteries do not provide infinite energy, they need to be charged up after use.

When one is creating mobile computing scenarios, sometimes maximum mobility is the goal and small devices with batteries make a lot of sense. On the other hand, it can be cumbersome to run a device that requires a lot of electricity, such as a video projector, off of batteries.

Writing about mobile computing, McCullough states "...an overemphasis on mobility assumes access anytime, anyplace to a medium that is the same everywhere, and that is otherwise little changed from windows-and-pointers computing as we know it." One way to overcome this sense of placelessness is to use resources such as electricity that are fixed in one location. A sense of embodiment is promoted through the reliance on immobile infrastructure.

While traveling in India and China over the past four years, I have been struck by the way that stationary infrastructure like electricity is harnessed to makes the street come alive. One image that has stuck with me is of a fortune telling robot. I saw this picture, which was taken in Mumbai, India, while working for CKS (Center for Knowledge Societies).



Plug-in fortune telling robot created in Mumbai, India.

Inspired by the fortune telling robots of Mumbai, I imagined what a cybernetic street musician might look like. Working with local noise musician Ronen Goldstein, we created an event called *cybernetic drum circle*. This street corner concert relates to previous generations of buskers, and street corner musicians who have played in public spaces. However, we differed from those models because our music required electricity. We plugged into the electricity outlet on the outside of a commercial building in Ann Arbor.



Cybernetic Drum Circle. Ann Arbor, MI. (2007)

I want to emphasize the temporary nature of this performance. In contrast to the mind-numbing muzak that plays on the outside of some stores all day long, year round, *cybernetic drum circle* is quick to set up and can be short in duration. This is an example of how an open electrical infrastructure could be used to promote a more diverse mental environment. One could imagine legions of street corner laptop musicians plugging in and doing short sets throughout the day.

Positioning the Work

Before finalizing the design of our project, we wanted to prepare a design strategy for the many possible use scenarios that might occur once our project was released into the world. We employed the scenario methodology that Stewart Brand describes in Chapter 11 of *How Buildings Learn*.

plugfinder.com was initially designed with groups such as Graffiti Research Lab in mind as potential users. Artists and hackers who wanted to scout out potential locations to do screenings or electronic graffiti would potentially find the website useful.

During our scenario planning exercise we realized that there were potential scenarios in which the tool we were creating could include a broader

demographic than just artists and hackers. The website might attract a broad section of society and become a “killer application” if it was presented in the right way.

We predicted that many potential users might be turned off by a subversive or confrontational tone. However, subversive uses could still be pursued through the technology, even if the tone of the front page was benign. We also predicted one possible scenario in which the database of electrical outlets would be valuable to a large company and that we could charge large companies to access the *plugfinder.com* database.

This scenario planning exercise was extremely helpful. It led us to realize that communities like Graffiti Research Lab would find this tool useful for subversive ends without necessitating an explicitly oppositional tone on the website.

If the tone of the website was kept neutral, and we blogged about the possibility of creating synergies with other companies’ tools, the site gained an aura of legitimacy. This would increase the number and types of people that would test and write about the tool, and diminish reactionary critiques.



An illustration of a hypothetical combination of *plugfinder.com* with Nokia’s augmented reality system.

If potential reviewers of the site thought that *plugfinder.com* was an Internet business instead of an art project they might take more time to review its functionality and potential uses.

The scenario planning exercise was carried over into our final design decisions. The site began to borrow the language and aesthetics of other Web 2.0 businesses, which were based on collecting and curating user-generated content to create value.

CREATIVE WORK

The Website



plugfinder.com This is the front page c. April 2007

The final design of the *plugfinder.com* front page features a dynamic map of the U.S. so that users can get a bird's eye view of recent activity. The sidebar has a section called *City Maps* that lists the cities in the U.S. with the most recent activity. There is also a section in the sidebar labeled *Newest Outlets* that lists the three most recently posted outlets. Having these three dynamic elements on the front page provides the user with important "at-a-glance" information.



Finding and sharing electricity in your city

[About](#) | [FAQ](#) | [Contact](#) | [Add a New Outlet](#)

[Home](#) » [create content](#)

Submit Outlet

This will show up on the map, so give it a descriptive name that offers possibilities, like, **Secluded area with big beige wall, great for music or movies.**

Give the outlet a name! *

▼ Categories

Location is a: *

municipality

Choose the type of building to which the outlet is attached

Electricity is: *

always on

Choose the electrical status at this outlet

City: *

what city is it in? (Please type a space between words; ie. Ann Arbor).

Outlet Tags:

Tag it! (comma separated).

Outlet description:

Describe the location of the outlet, the surroundings, or any other information you think might help plan performance. *Example: The outlet is located in a fairly closed-off parking lot. There's also a large, whitish wall. This might be a good place for generator shows or guerrilla cinema.*

The “add an outlet” form (this page and next) asks for a variety of information in addition to the geographic location, such as a description of the outlet, the kind of building it is attached to and whether the electricity is always on or not.

► **Input format**

Location

Map Satellite Hybrid

Latitude:

Longitude:

If you wish to supply your own latitude/longitude, you may do so here. Leaving these fields blank means that the system will determine a latitude/longitude for you, if possible.

▼ **plug_image**

Choose File no file selected

Update

Preview Submit

The geographic location of the outlet can be pointed to on a physical map of the United States, or users can enter in the longitude and latitude if they have access to GPS technology.

Home

mt. tabor spatial projections on trees

Location



Fri, 2007-03-09 03:49 Submitted by meximese

park, or public space | Portland | always on | 3D
projections | high visibility | park | projections | theater

mt. tabor spatial projections on trees. This is a specific plug page circa April 2007.

After seeing this entry one user emailed in this comment:

BTW, I especially like the Mt. Tabor shed outlet. these little-know power sources in the wilderness are great resources for those of us who go camping with laptops, Q-phones and iPods that need a pick-me up. No, seriously, if you aren't near your car converter how can you work while on vacation (or check the weather forecast before the pre-dawn summit assault? This could a huge (market?) aid to the information-addicted.

Guided Walking Tour

The Following images are all from the first *plugfinder.com* guided walking tour. The walking tour took place on Monday, April 2nd, 2007. All photographs were taken by Brad Smith. The following artists created or installed work at an electricity outlet as part of the walk:

Forest Bright
Charles Fairbanks
Adrienne Finelli
Melanie Manos
Nick Tobier
Adrienne Vetter

For the first *plugfinder.com* guided walking tour artists were invited to pick one of the electricity outlets mapped on *plugfinder.com* and create or install an artwork that took advantage of the open electricity and the specific circumstances of the site. Each of the artists' proposals were combined and ordered into a guided walking tour.



Helium balloons with a strand of white Christmas lights served as prop for the tour guide. When a stop was reached, the lights were plugged in and the balloons were allowed to float skyward.



Melanie Manos projected an image onto the wall creating a form of e-graffiti.



Melanie Manos' set up consisted of a video projector on a mobile cart.



The tour paused to take in an installation by Adrienne Finelli. The police who drove by were intrigued but not threatened by a living room set up on a street corner.



Nick Tobier told the tour group about the cultural history of this one block.



Tobier used a hand held slide projector to organize his talk.



Adrienne Vetter towed a car into a parking garage as part of her installation.



The windshield of the car was treated so it could hold light. A video was projected on the surface of the car, and an audio installation was installed on the inside of the car.



Forest Bright played music on the third floor of a parking garage.

DISCUSSION

When I started this project I wanted to combine my early experiments in distributively authored video performances with walking tours and geolocate media. I envisioned myself creating a project that would build community, and provide a tool or resource that would enable other people to become active contributors to a larger system.

I believe that the *plugfinder.com* project became an example of what Francis Halsall calls *Systems Art*. He defines this branch of creative inquiry as "an interest in the aesthetics of networks, the exploitation of new technology and New Media, unstable or de-materialised physicality, the prioritising of non-visual aspects, and an engagement (often politicised) with the institutional systems of support (such as the gallery, discourse, or the market) within which it occurs."

plugfinder.com is a resource that uses geolocate media and the World Wide Web while relying on its users for its distribution. Both the website and the guided walking tours de-emphasize the visual nature of art and prioritize the experiential and situational possibilities of art making. By inquiring into the topic of electrical infrastructure, the project engages the support system of electrification that is at the heart of any electronic media project. The website and related activities invite anomalous behaviors and creative activities at fixed locations.

The significance of this type of project is in calling attention to and challenging the assumed use of electrical infrastructure. Would-be infrastructure designers could incorporate some of the lessons learned from the street level use of electricity into their next rounds of design. Municipal governments and economists could use this document to think about future scenarios when social, cultural and natural capital are considered as valuable as fiscal capital.

This project posits that providing electricity as a public good creates previously unimagined interactions between humans and the built environment in which they inhabit. Providing free public access to electricity may be one of the building blocks for a city based on the inhabitable circulation, increasing the potential for citizens to participate in their cities in a more improvisatory and democratic manner.

In the process of developing this project, I have become aware of my particular interest in establishing collaborative models and communication networks. Instead of the death of the author, we are seeing artists take up the role of toolmakers, systems facilitators, and manufacturers of mediums. This role allows artists to engender ecologies of prosumers: audience members who are both readers and writers, both PROducers and conSUMERS of information.

plugfinder.com is one example of a project that establishes an ecology of readers and writers. Future projects that I pursue will similarly draw on the aesthetics of networks, new technologies, experiential art making and a politicized engagement with institutional systems and infrastructures. This project is one tool of many that I hope to create that will give citizens the ability to author the cities of their imaginations into existence.

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