

# A Sustainable Approach to Development

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## The Crossroads Development

Springfield, Missouri

A development of:

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Limestone Development

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## A Sustainable Approach to Development

In this paper, we will look at how commercial property has typically been developed in the past and then look at a new sustainable approach to the development process.

### **Traditional Commercial Greenfield Development**

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For many years, traditional commercial development of “green fields” focused on approaches which maximized the developer’s opportunity for profit. The metrics of this development process included:

**High Floor Area Ratio** – The key measure is the ratio of building area that you can build to the total land area. The higher the ratio, the more you can charge for the land.

**Low Green Space Percentage** – The green space on the site as a percentage of the land area is also a measure. Indirectly, it means that you are not losing building area. While some green space is desirable, there is a point at which the green space requirement decreases the value of the property in the buyer’s mind as it limits development potential.

**High Impervious Surface Ratio** – In looking at the land you have pervious surface and impervious surface. The impervious surface consists of buildings, parking, drives, sidewalks, patios, etc. The pervious surface is typically grassed and landscaped areas – “green space”. The impervious surface provided what the commercial development wants, parking and buildings mostly.

**Maximize Land Pricing** – You can only charge for land what the market is willing to pay. What the market is willing to pay is determined by a mix of location, access to public thoroughfares, land use rights (zoning) and what other similar properties are available for. It is important for the developer to figure out how to position the property to maximize his land sales asking price.

**Minimize First Cost** – When you develop land, you have to minimize your first cost. The bare land price is the foundation of the development cost structure, then you have to add in the professional fees to do the development planning design, engineering, platting and oversight of the development work. The cost to provide the public infrastructure (the utilities, streets, storm water management systems, etc.) is added to the cost structure. Then you factor in miscellaneous legal fees, interest carrying costs, marketing and realtor fees for all the property.

**Force the Land Shape** - As a part of the development effort you have to figure out how to maximize the usability of the site. A flat site with a generally rectangular shape is much more usable than a sloping site with an odd shape. This makes the flat rectangular site more valuable and more marketable. As a result, many developers are willing to spend money up front to force the land shape. They will take a hilly site and make a large flat spot out of it to improve the marketability of the land.

**End of Pipe Storm Water Management** – Storm water management has become a very critical aspect of development as the amount of undeveloped property began to disappear and the run off from all the developed properties began to create downstream flooding problems. Once public officials determined that they needed to manage this process, they approached it in a simplistic manner by adopting the concept that the run off from a property after it is developed cannot exceed the run off of the property in its predevelopment condition. Obviously, this meant that existing developed properties were grandfathered and their run off continued to do what it has always done.

New development was required to calculate the run off of the property in its predevelopment condition under certain storm conditions and then design their project to match that runoff (in cubic feet per second) after development. To do this they typically built detention basins which would catch all the runoff and then let it off at the predetermined rate over time. In effect, this would release the runoff at the prescribed rate but it would stretch it out over a fairly lengthy time frame.

The size of the basin was calculated to handle the runoff created by the new impervious surfaces under a certain storm condition. This storm water was released through the “end of a pipe” in a point load. The key thing to remember is that run off from undeveloped land typically is not collected and channeled to a point load but instead is a natural sheet type runoff at a very low velocity over the vegetated land. While the runoff rate in the developed condition is supposed to be the same, the character of the runoff is concentrated instead of distributed. This requires additional planning on how to handle this point load downstream as all the point loads accumulate.

**The First Flush** – In a rain event, the first one inch of rain basically washes the impurities which are on the impervious surfaces away. This “first flush” carries these concentrated pollutants through the detention basins and into impervious channels and drainage ways ultimately ending up in our natural waterways. The water quality in these waterways in cities and urban areas suffers.

**Water Quality Measures** - In recent years public bodies have been forced by EPA and their State Department of Natural Resources offices to address water quality as well. When applied to “end of pipe” storm water management this often means

creating vegetated filtration strips for the storm water to cross prior to the basin. In the basin design they increase the size and reduce the outflow to allow sediment to settle out.

**Land for basins wasted** – These basins eat up the available land for development as you can't park in them or build in them. They can be built as underground basins and parking can occur on top of them at significant cost but the water quality measure become even more problematic. When you are dealing with a development of reasonable size, a regional basin is often the solution if the topography allows. The amount of land for these basins is often up to 20% of the total land area. These basins are often referred to as "dry lakes" and they have fences around them and many times are not maintained well.

**Downstream flooding and erosion issues** – When you have these storm water point loads and a collection of drainage ways all leading to our natural waterways, you increase the opportunity for flooding. Undeveloped land absorbs a significant amount of the rain event and the storm water which does not get absorbed runs off in a more controlled and slower rate in a sheeting effect. The concentration of this water running in drainage ways at a much higher velocity begins to exceed the ability of the downstream drainage ways and waterways to handle the water. The result is that the water begins to back up and flooding occurs. The more upstream development, the higher the likelihood that downstream areas, which previously had not flooded, will begin to experience flooding and erosion.

## **A Sustainable Approach to Development**

**In looking at a sustainable approach to development, we approach it a little differently.**

**Floor Area Ratios** – We still need to be thinking in terms of getting good floor area ratios. However, the focus needs to shift to thinking more vertically. We need to get the floor area on multiple floors which means that the building footprints can be smaller.

**More Green Space** – Green space is important for many reasons.

- It enhances the project appearance.
- It is a great source of absorption of rainwater – this reduces the amount of run off we have to manage.
- It is a filter for storm water improving the water quality of the run off.
- It slows down the flow of the reduced run off.

**Working with the land contours** – Rather than spending money on reshaping the land trying to create the flat spot, we need to be working with the land, identifying the natural drainage patterns and working with them. The money we save can reduce the land sale cost and thereby allowing the buyer to purchase more land.

**Mixed use zoning emphasis** – The traditional zoning logic was to separate uses isolating the residential uses through a step down system. This takes away the opportunity for anyone to walk to work, to the store or to other activities. It forced people to drive everywhere. This increased the traffic load on our streets requiring more traffic lanes. This also means that every business has to have parking since their customers all drive to their business. By discarding the traditional step down zoning and adopting more mixed use zoning we can:

- Begin to encourage less driving,
- We can create more walkable communities where you live near where you work and shop.
- We need less parking on site which allows more building on the lots.
- We reduce the traffic load on the street system.

**Encourage the use of Geo Thermal Energy** – We have always had an untapped resource right under our feet. The temperature of the earth a few feet below grade is a constant 50-55 degrees. This can be used to heat or cool our buildings by using the earth as a heat exchanger in conjunction with our mechanical systems. Ground source heat pumps have to dispel the heat generated when in air conditioning mode and can draw the heat from the earth when in heating mode. This makes them much more efficient than they are using air to air heat exchangers. The first cost is a little more but the payback period is generally in an

acceptable range particularly as energy demand and the related cost of energy due to this demand increases.

### **Low Impact Development (LID)**

Another key to a sustainable approach is the use of Low Impact Development (LID). LID is used to manage rainfall at the source using uniformly distributed decentralized micro-scale controls.

The goal is to infiltrate, filter, store, evaporate, and detain runoff close to its source rather than in a large remote basin somewhere.

Integrated Management Practices (IMPs), are the building blocks of LID. Refer to: (<http://www.lowimpactdevelopment.org>). LID addresses storm water through small, cost-effective landscape features located at the lot level- the source.

The LID approach includes five basic tools:

1. Encourage conservation measures
2. Promote impact minimization techniques such as impervious surface reduction
3. Provide for strategic runoff timing by slowing flow using the landscape
4. Use an array of integrated management practices to reduce and cleanse runoff
5. Advocate pollution prevention measures to reduce the introduction of pollutants to the environment.

### **Benefits of Low Impact Development**

This approach can minimize our pollutants impact on the natural environment. By containing the pollutants and not allowing them to be concentrated, they are easier to manage and can do less harm.

By eliminating or significantly reducing the storm water collection and transmission systems and minimizing the retention systems we can see lower up-front costs.

It is also much easier to design storm water management systems when we design the project rather than before anyone knows what the project might be. There is often the risk that the systems designed and built in advance creates significant limitations to the use of the site and it might require reconfiguration at added cost to make the site work.

### **Conflicts with existing ordinances and zoning**

As is often the case, many communities have ordinances in place addressing storm water management and zoning. These ordinances are prescriptive in nature and are based on an “end of pipe” solution.

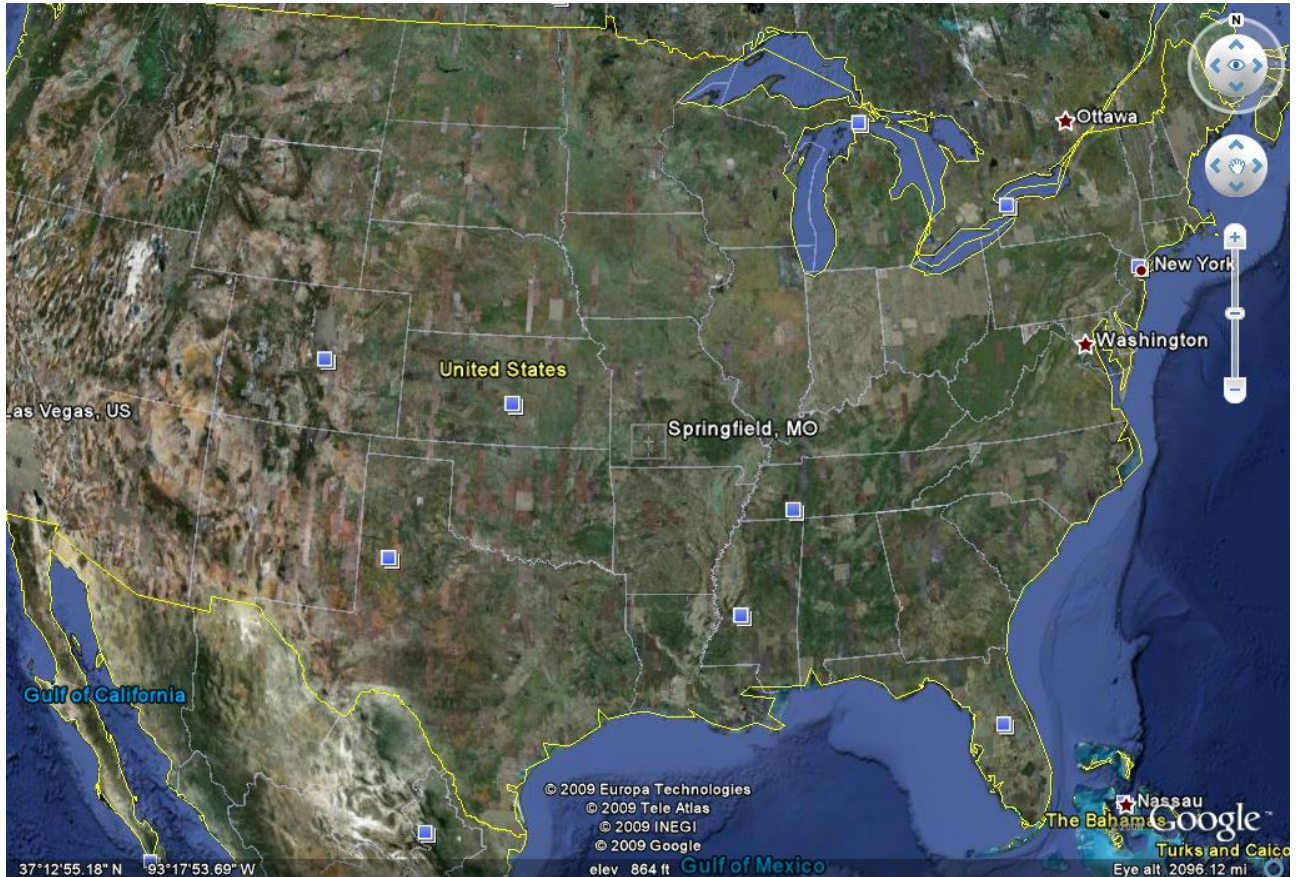
This can prevent creative thinking and officials are not given discretion to accept alternate approaches which can have the desired end result. Public Works Design standards are all based on the same “end of pipe” solution. Mandated curb and gutter street systems promote the concentration and transmission of the storm water preventing any opportunities or absorption and filtration at the source.

These ordinances, regulations and the related development bureaucracy is the biggest challenge facing a sustainable development approach.

Education of the community leadership about the approach and its benefits has to occur in order to make the necessary changes and to gain the flexibility to move a sustainable development forward.

# The Crossroads

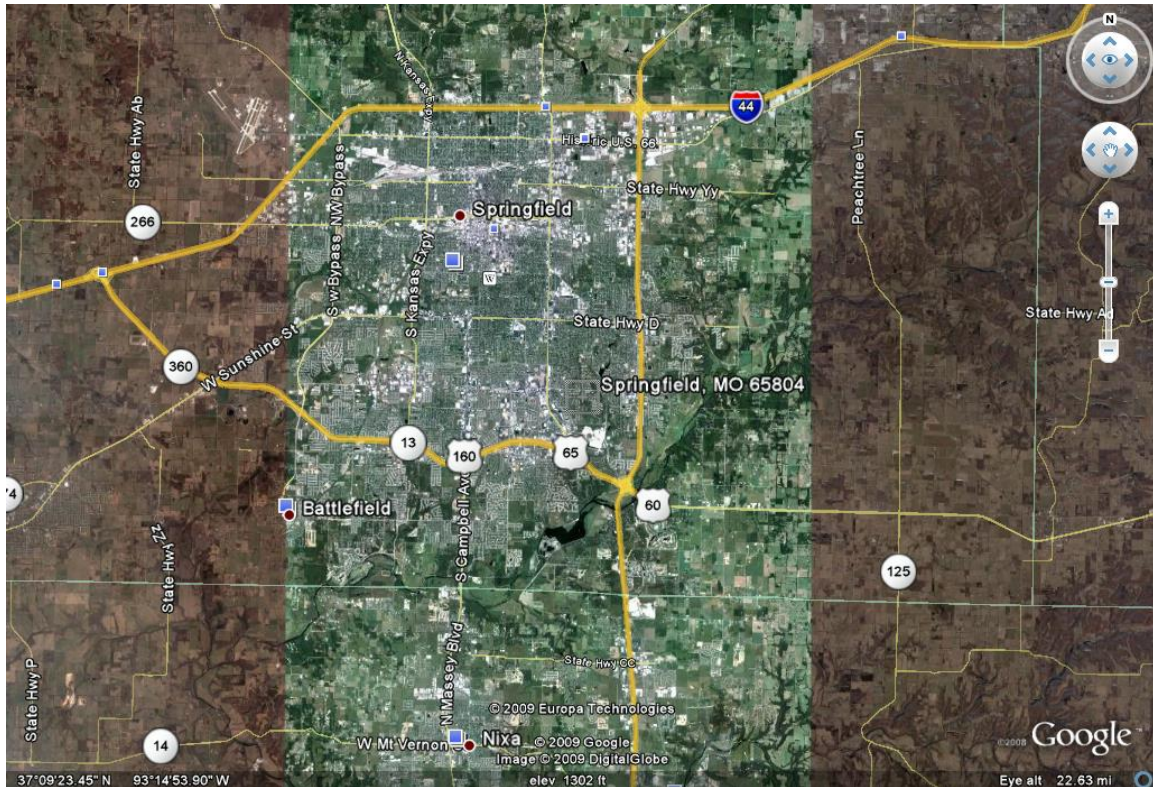
## A 500 Acre Mixed Use Development Springfield, Missouri The Community



Springfield, Missouri, sits atop a plateau of the largest mountain range in the country - the Ozark Mountains. Surrounded by rolling hills, the city offers the best in metropolitan and outdoor adventure, making it a perfect family destination. With more than 400,000 people in the metro area and millions of tourists each year, Springfield is rich with interesting and entertaining attractions, approximately 6,000 hotel rooms, more than 800 dining options and a variety of shopping and cultural activities.

Springfield's central location in the nation also makes it easily accessible by major highways and the Springfield-Branson National Airport.

Springfield is the third-largest city in Missouri and the largest Springfield in the nation. The U.S. Census Bureau estimates the population within the city limits is 154,777. The estimated Metropolitan Statistical Area (MSA) is more than 420,000.



Our 500 Acre site is located in the Southeast quadrant of town and is on U.S. 65 Highway just north of the US 60 and US 65 Interchange. This area has a very high demographic with the highest average income in the community located within five miles. US 65 is also the major arterial which serves the Branson, Missouri tourism traffic streaming north and south. US 60 is the east west arterial serving this same traffic base.

The 500 acres has laid dormant as a result of no access to the property. It is bounded on the east and south by the James River. When US 65 was building in the late 60's the Battlefield Road interchange, about two miles north was the last access allowed to 65 and this property only had access via a two lane overpass at Gasconade and through crowned rural county roads connecting to Battlefield on the north. The lack of access to US 65 and very limited connectivity to the existing street systems of the City and County, the property was limited to agricultural uses and some residential use.

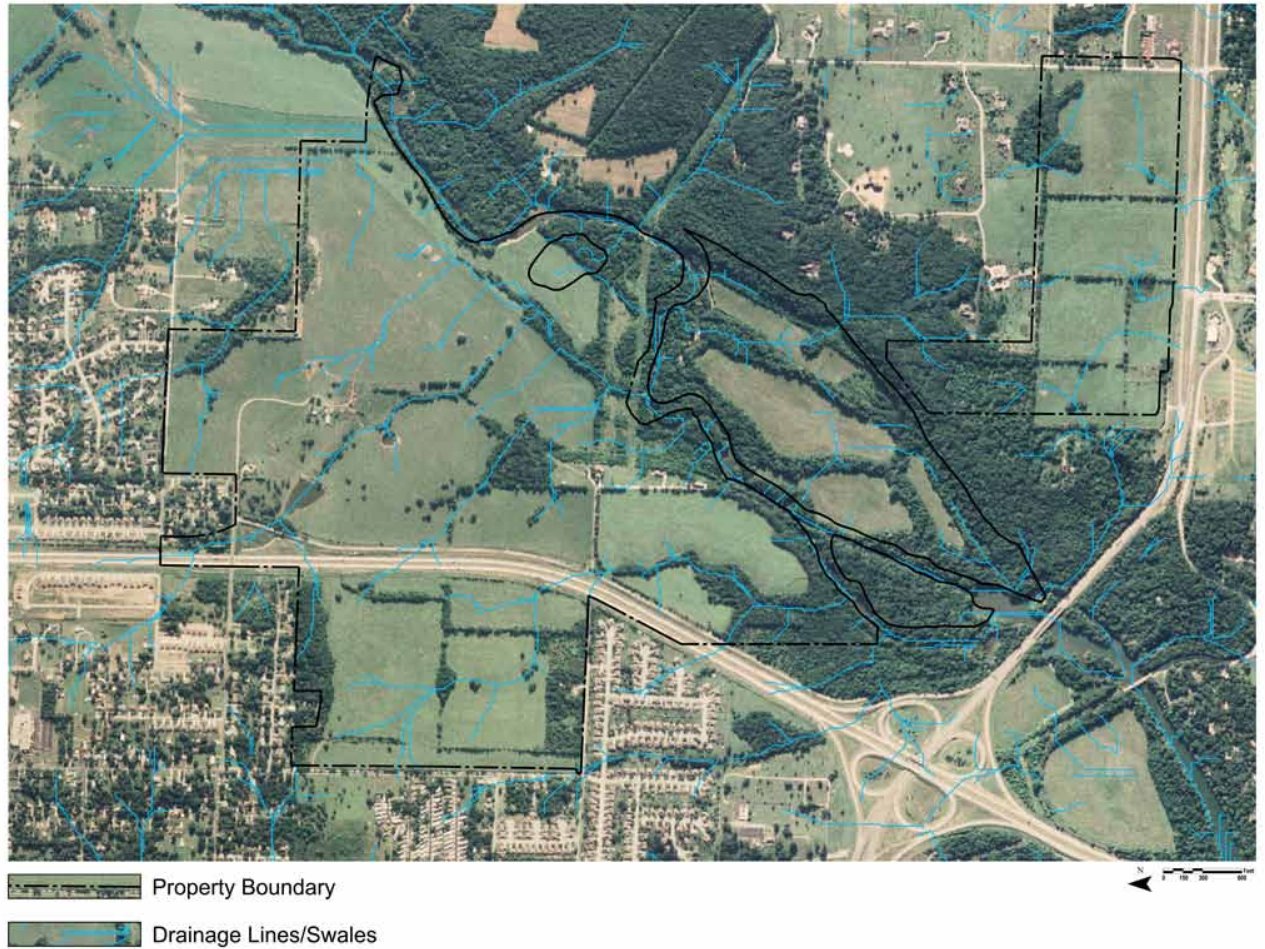
# Site Boundaries



This map of the site boundaries is rotated with North to the left. The black line represents the property boundaries. In this aerial image you can see the barriers to development. The James River to the east, 60/65 Interchange to the south, lack of access to US 65 and few roads into the area from the north.

## Natural Drainage Patterns

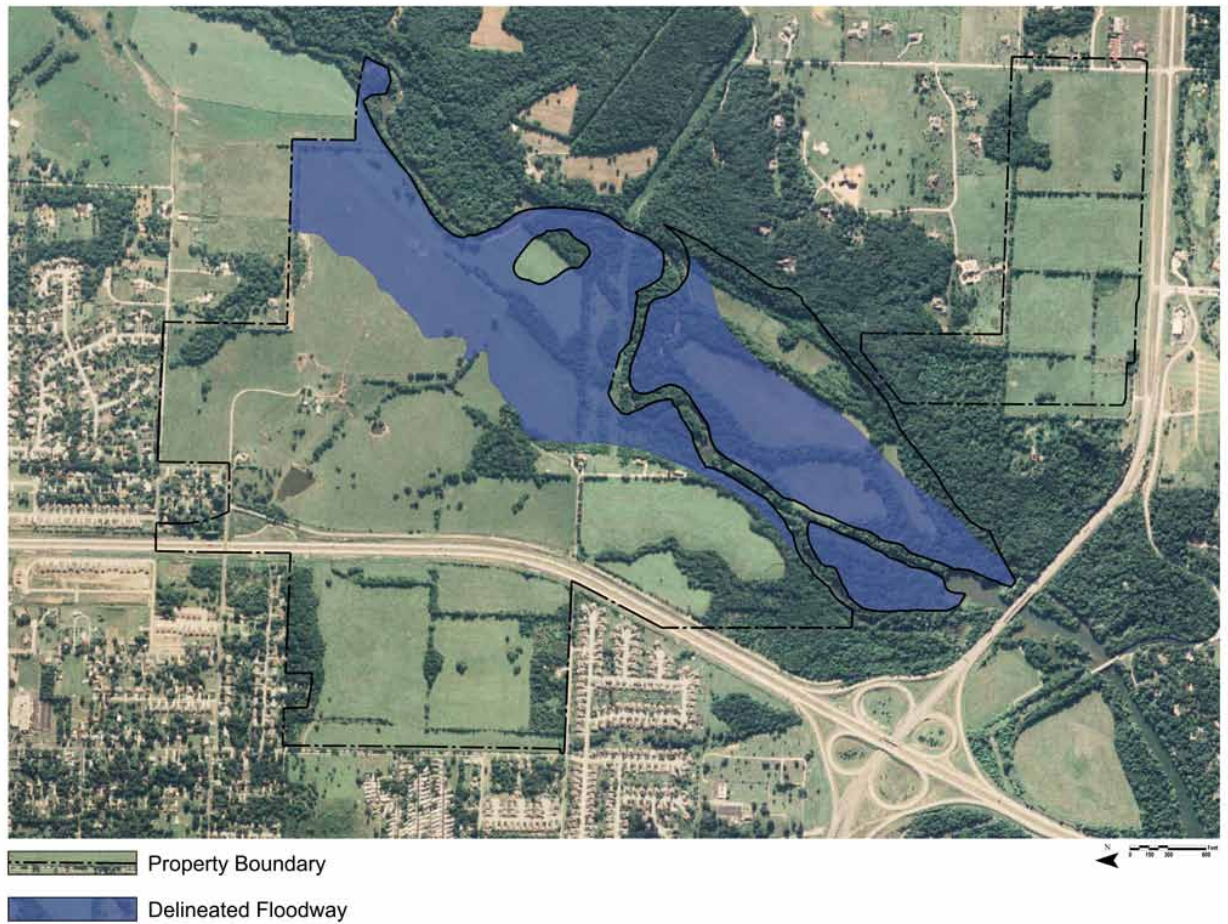
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As you can see in this map, there are natural drainage patterns on the site all directing rain water southeast to the James River.

## Flood Plain Areas

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FEMA has identified the 100 year flood areas which are reserved and protected from development. As you can see, there is a significant amount of the property which is in the flood plan and will not support development.

# The James River

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This map reflects the James River as it borders the property. Interesting to note how the river has moved from its platted boundaries when the property was last surveyed.

## Development Issues

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**No access to US 65** – This was the biggest and most challenging barrier to development. Missouri Department of Transportation has a policy which stipulates that interchanges should not be any closer to each other than three miles. This spacing would allow for easy on and off traffic access with few conflicts with merging on and off. The current spacing between the 60/65 interchange and Battlefield was a little over four miles leaving less than three miles between a possible new interchange and either existing interchange.

**Lack of connectivity to City and County road system** – With only the Gasconade Road overpass providing access from the west and the limited access to the site from the north provided by Murphy Road, any development on this property would have challenges even providing nominal fire and emergency access much less daily access for residents.

**Impact of added traffic to neighborhood** - Development of this much land would add traffic to the existing street system. The impact of the added traffic can overload the roads to the detriment of the overall area.

**Zoned Single Family – low density** – The property was zoned either single family residential or agricultural. A zoning change would be required to allow this development.

**Neighborhood opposition (NIMBY)** – There is nothing more emotional to homeowners than change. The idea of some empty land being changed to any sort of development usually faces opposition for many reasons. Most simply take the position that development might be good but “Not in My Back Yard”.

**175 acres of flood plain property** – Out of the 500 acres of land, there is roughly 175 acres within the flood plain. This flood plain property also is along the James River and represents a very environmentally sensitive area.

**Rolling topography and existing drainage patterns** – This property is not a flat piece of property. As a part of the Ozark Hills, it has some gently rolling hills and valleys which contain natural drainage ways and will require careful attention during development.

**City Design Standards** – Springfield is a community that has adopted the “end of pipe” storm water management requirements. To do a sustainable development we will need to be able to vary from the standards and design the public infrastructure work differently in order to achieve our sustainable goals.

## Development Assets

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**On US 65 Highway** – US 65 is a major highway with a significant load of traffic traveling to and from the Branson Missouri tourist town.

**Control of both sides of the Highway** – We own both sides of the highway where the interchange needs to occur.

**Adjacent to US 65 and US 60 interchange** – This interchange also has the east west traffic of Highway 60 to complement the traffic of US 65

**High demographics** – The Southeast part of town has the highest demographics in the area. This area has a significant residential base with the highest average household income in the region.

**Overlooking the James River and flood plain** – The significant flood plain and the environmentally sensitive James River is also an asset in that the development can be focused to take advantage of the natural assets of these areas.

**All utilities on site** – the property has major water, sewer, gas and electricity service running through it. We do not have to bring any to the site.

**No commercial competition in area** – The majority of the commercial areas in the community developed prior to the construction of US 65 in the late 60's. When the new US 65 was built it was referred to as the "Bypass" as it bypassed all the commercial areas which had developed along the original US 65. As a result US 65 does not offer very many commercial opportunities as it passes through the Springfield area. There is truly nothing along 65 to encourage people to get off the highway and go into Springfield. This lack of competition will make this development much more appealing and much more likely to draw traffic off the highway.

**Greenways and Blueway Trail connectivity** – The Springfield-Greene County Parks Department has developed, with Ozark Greenways, a Greenway trail in this area. Additionally, they have added a Boathouse with Kayak and Canoe rentals south in Lake Springfield. A Blueway – a water trail potential exists with the access to the James River on this property being the other end of the water trail. Providing for the extension of these community assets on to this development is a plus for the development.

## Eating an Elephant

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There is an old riddle: *"How do you eat an elephant? – One bite at a time."* This development is just like that. In looking at the project, it can easily overwhelm you when you think of everything that has to be accomplished to make it happen. But tackling each challenge individually makes the overall effort less monumental. Here are the steps that we have been working on:

**Access to US 65** – It is clear that no development is possible without access to US65. We have been working on this issue for ten years or more. In the past MoDOT would respond to every inquiry with a refusal to consider it since the spacing would not meet their 3 mile between interchange policy. A few years ago we were able to get MoDOT to agree to consider the interchange if we could show them how it could be done and not adversely affect the level of service on the other interchanges in the area.

Coincidentally, MoDOT was working on a redesign of the 60/65 interchange at the time and we retained the engineers who were doing that work to analyze the interchange and determine the optimal design and to model the traffic in the area. Their efforts over a fourteen month period provided us with a design and the necessary traffic analysis which supported the addition of the interchange to US 65. In order for them to model the traffic system, we had to do our preliminary development planning to determine the desired density of the development and the type of uses we were going to include in the development. This gave our engineers the traffic load which the development would generate.

After a lengthy review, MoDOT did agree to allow the interchange. As part of their approval, they required:

1. The interchange cannot be constructed without providing necessary connectivity to the existing public road system the north, east and west.
2. The traffic generated by the development could not exceed the traffic load used in modeling the interchange.

**Zoning for a Mixed Use Development** – With the existing zoning a mix of residential and agricultural, we had to rezone the property to the uses which we wanted and this required a lengthy zoning process with numerous community meetings and public hearings. It was obvious that the conventional zoning districts were too rigid and did not provide the flexibility we wanted. We proposed a Planned Unit Development which gave us the ability to virtually write our zoning requirements.

### Allowed Zoning

- General Retail -1,800,000 SF
- Office - 300,000 SF
- Low Density Residential Townhouse - 300 units
- Medium Density Multi-Family Residential and Multi-Family Senior Living - 450 units
- Hotel/Conference Center 300 Rooms + 60,000 SF of meeting rooms / conference space
- Mini Storage 100,000 SF
- **Unlimited multifamily residential uses in commercial area above the ground floor.**

### Other Provisions

- Zoning is only effective with the construction of the interchange and the related connections to street system to the east, west and north.
- No parking requirements – this does not mean that there will be no parking provided. It means that parking can be provided to meet the needs of the development as determined by the property owners. No arbitrary parking requirements are applied. This promotes the possibility of parking structures, shared parking and realistic parking provisions.
- 25% pervious surface ratio but only 15% can be green space or other living surface. This means that 10% of the lot area has to be a pervious paving or similar surface which allows storm water to infiltrate into the ground.
- Adoption of Low Impact Development techniques.
  - Retain the first ½" of a rain event on the lot.
  - Use of bioswales and vegetated drainage ways.
- Dedication of a 200' conservation corridor along the banks of the James River – Ozark Greenways has agreed to take the conservation corridor in a Land Trust.
- Extension of the Greenway trail in the Conservation corridor.
- Public Works Director has the ability to waive or deviate from existing Design Standards and requirements if it is in compliance with LID Integrated Management Practices.
- Bufferyards and building setbacks to appease the neighbors

After a year of planning and a six month effort, we were able to secure the zoning approval.

### Infrastructure Funding

- The total cost of all projected infrastructure for the development required by the Planned Development is \$62,000,000
  - **West Connector** - The required connection to the west has been mapped out to travel west, to connect to Lone Pine at this time. This will be an arterial width ROW with a road width suitable for the traffic projected by the traffic studies. The projected cost for this road and ROW is \$4,000,000
  - **East Connector** - The required connection east is required to cross the James River on a new bridge and then connect to the County road system at JJ and farm road 170. The cost for the Bridge is estimated at \$2,400,000. The cost for the road is estimated at \$6,000,000.
  - **North Connector** -The connection north is required to travel diagonally from the New Republic Road arterial to Battlefield near Kinser Bridge. This will be as far east as is practical to minimize the impact on the Combs property next door. This connection is projected to cost \$1,800,000.
  - **Utilities** - We will have to relocate some significant electrical primary service lines as well as extend the exiting electrical service, gas lines, water lines and sewer lines throughout the development. The probable cost of all of this work is \$12,000,000.
  - **Low Impact Development** - The commitment to Low Impact Development has a significantly less cost than in traditional development. We have budgeted \$2,500,000 for this work
  - **Mass Grading** - To get the interchange constructed, we will have significant grading challenges. Additionally, after the interchange is engineered, then we need to apply the LID development techniques. We have set an initial budget of \$5,000,000 for this work.
  - **Fees** -The engineering work necessary to accomplish all of this work is estimated to cost \$5,200,000. This includes Civil Engineering, Surveying, Geo Technical Engineering, Landscape Architecture, Planning, Administration of the construction work and reimbursable expenses.
  - **Contingencies** -There are always unforeseen situations which require changes in project scope and related costs. We have budgeted \$6,600,000 for these contingencies
- The cost of this infrastructure will be borne by the developer.
- The funding will need the use of Tax Increment Financing and other funding vehicles.
- We must have the committed retail businesses to fund the bonds for the development.

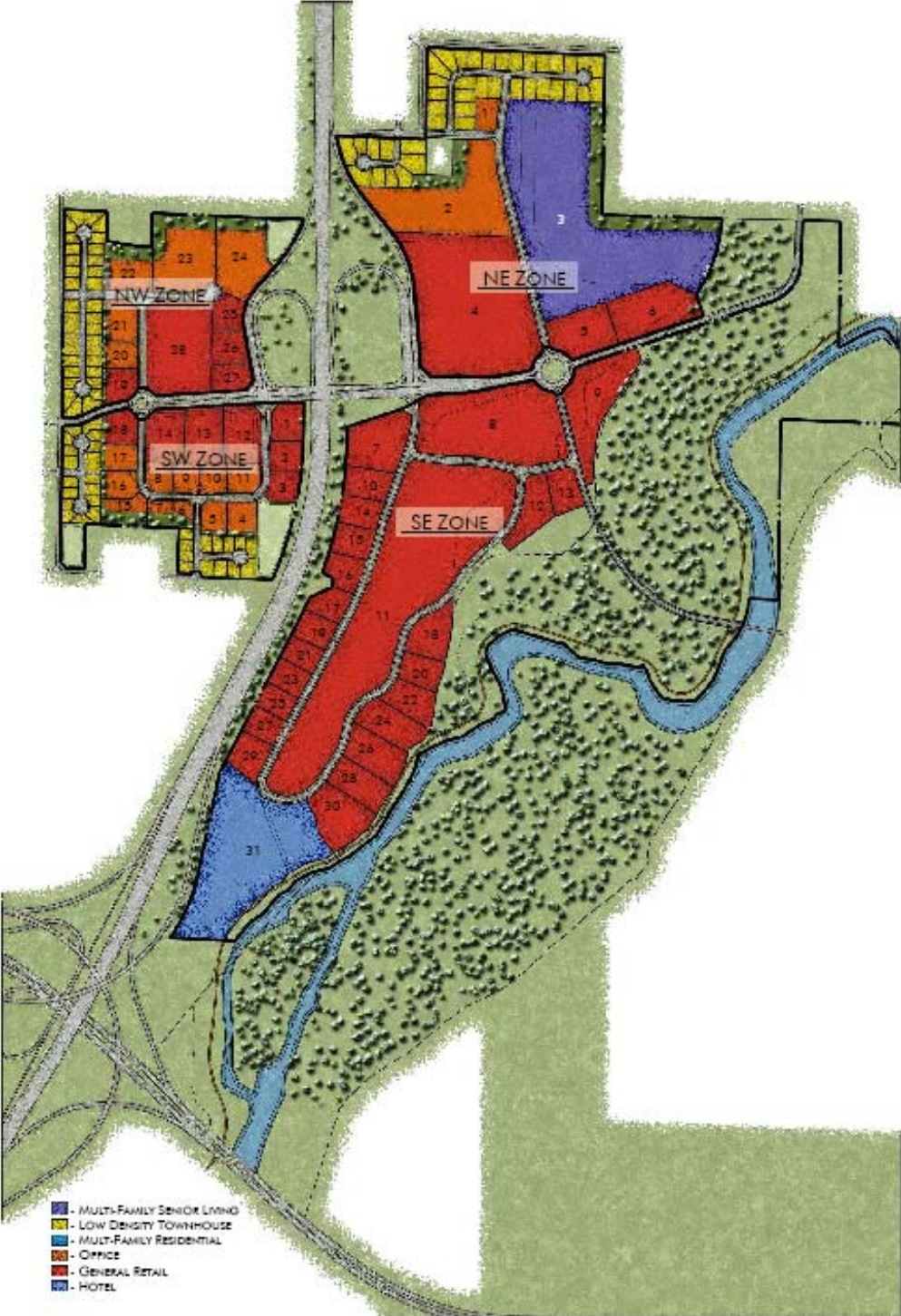
### **The Non-Commercial Amenities**

- Public Private Partnership with the Parks Department and the Library
  - The Parks Department has indicated an interest in developing the flood plain areas as park facilities. The nature of these facilities is yet to be determined.
  - The Springfield-Greene County Library is interested in a branch library in the development.
  - USOC Training Center Opportunity – The US Olympic Committee has already established four Olympic Training facilities here in Springfield. There is the possibility that other might come if land in this development is offered and available.

### **Conservation Measures**

- We will establish a conservation buffer along James River
- Integrate the Greenways Trail along James River.
- Addition of James River Access for Blue Waterway to compliment Parks Boathouse Lake Springfield access for kayak/canoe recreation
- Use of floodplain for water quality efforts relating to storm water run off from development
- Integration of Park recreational opportunities into flood plain.

# The Development Master Plan



MAY 26, 2009

## ZONE MAP 60/65 DEVELOPMENT



# The West Side Development

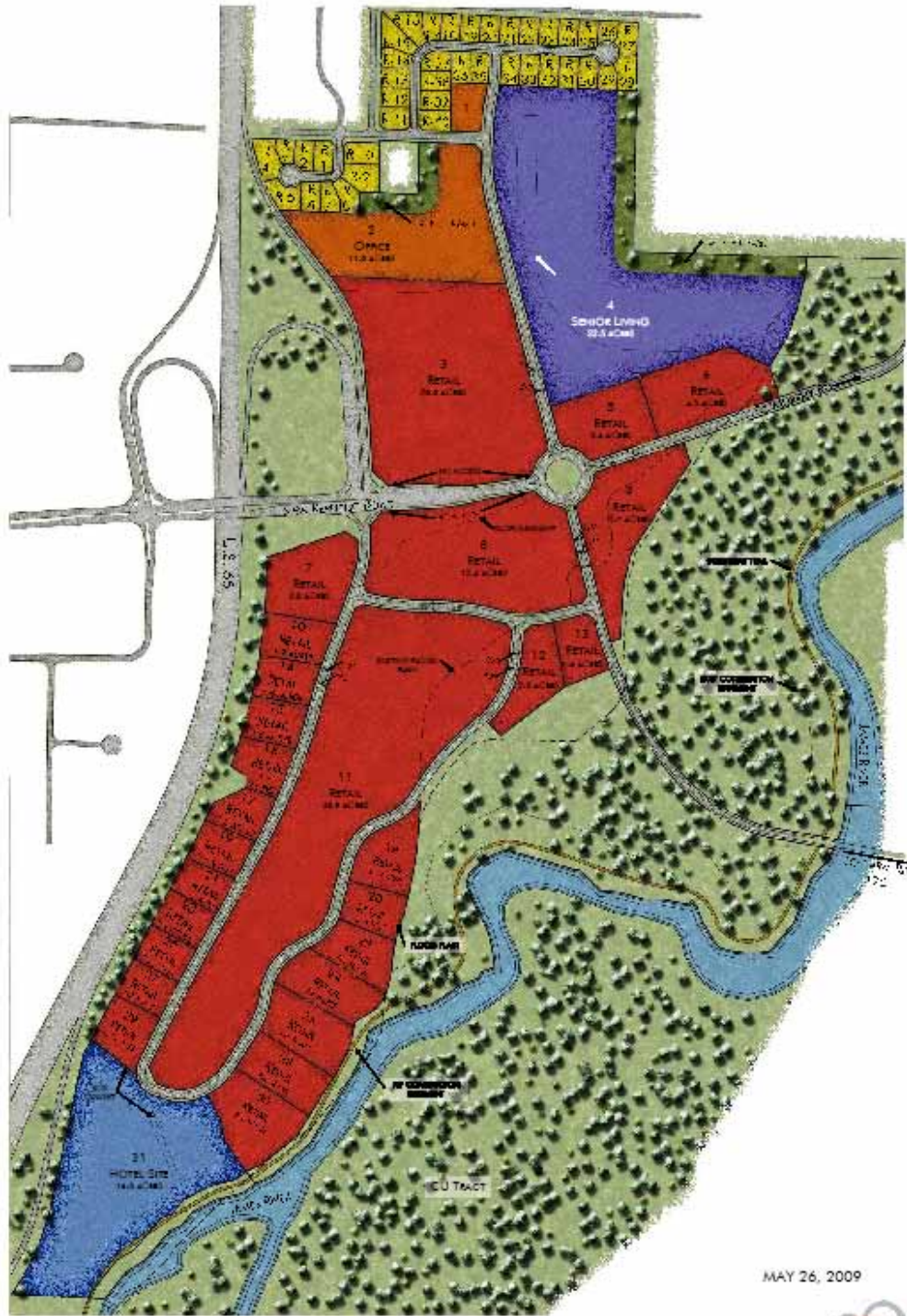


## 60/65 DEVELOPMENT-WEST SIDE





# The East Side Development



60/65 DEVELOPMENT-EAST SIDE



## Sustainable Design in The Crossroads

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**Silver LEED Certification Goal** – While we cannot mandate that all properties meet the Silver LEED Certification, we can encourage it and even include a rebate from their purchase price for those properties that achieve that certification. Many property owners use the LEED certification as a target and work to that but do not go through the certification process and save that certification expense. That would be fine as well. The key is to go for a sustainable project that meets the LEED requirements.

**Geo-Thermal Energy** – We are investigating the potential of a geo-thermal utility which pipes the constant temperature groundwater throughout the development. This would allow all properties to take advantage of the energy available and to help reduce their ongoing energy costs. The results of this study should be available within the year.

**Mixed uses creates walkable neighborhood** – By developing a mixed use development, we are creating a community where many people can live, work, recreate and shop. This walkable community reduces the need to drive and takes cars off the road.

**Use of the flood plain and environmentally sensitive areas for Recreational Activities** – Just because an area is designated as a flood prone area does not make it useless. Instead it is important to find uses for the land that enhance the community and engage the population in conservation education and recreation. This also means that the land will be better maintained and protected.

**Public transportation elements** – We are in preliminary talks with City Utilities of Springfield regarding the extension of the Springfield bus system into our development. CU is charged by charter to provide bus service to the community and if we can get the bus service extended to our development, that would provide a link to all of Springfield including the Airport, downtown, major business areas, residential areas and other major commercial areas.

**No parking requirements** – Quite simply, our ability to provide the parking that we feel is necessary rather than some arbitrary standard for each lot allows us to plan our parking needs, locate the parking in the most appropriate spot and concentrate the uses closer together in order to make the development more walkable. This means that fewer parking spaces will be required due to the diversity of parking needs for different businesses. At the end of the day, this means that we can have more green space and open vegetated areas for the absorption of the rainwater.

## Economic Benefits of the Development

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The 500 acres currently pays about \$3000 of property taxes per year as agricultural land.

The construction cost of all the work in the development is expected to be \$500 million over ten years.

Assuming that a modest 40% of the cost of construction is labor, we are projecting that the construction of the infrastructure and the buildings will generate \$200 million of direct labor revenue to the community over ten years.

The businesses in the commercial development potentially represents **2250 new direct jobs** created in the community.

Economic Development professionals estimate that for every new direct job created with a development that .46 indirect jobs are created. The number of indirect jobs created would be another **1035 jobs**.

The total of direct and indirect jobs created could be **3285 jobs**.

The Appraised value of the development at completion is expected to exceed **\$442 million** which can generate **\$7.9 million per year** of Property Tax.

Assuming a modest **\$275 per sf/year** of retail sales, the gross sales for the development would be **\$412 million per year** which generates over **\$27 million per year** of state, county and local sales tax revenue. **\$11 million of that is local sales tax**.

The economic impact on the community of a development like this is calculated by adding the sales taxes, property taxes and direct construction costs per year and use a modest **1.85 multiplier**.

When this project is 100% complete the combined sales and property tax will be approximately **\$35 million** and using the 1.85 multiplier, the annual economic impact of this development could be near **\$66 million per year**.

## **Time Frame**

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With the access to US 65 issue resolved and the Zoning in place, we are now in a position to move forward with the detailed planning and development work. Our projected schedule for the development is as follows:

- **Initial planning and development work** – one to two years
- **Construction of Infrastructure** – two years
- **Construction of initial critical mass** – 2- 3 years (concurrent with infrastructure)
- **Early opening of first businesses** – 2013
- **Ten year build out projected.**

## **Conclusion**

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**New commercial development has always been driven by pure financial metrics. In today's world, with expanding population growth and shrinking natural resources, it is imperative that as we develop our land, we do so with conservation and protection of those natural resources in mind. With careful planning and the cooperation of community leadership, this can be accomplished while not losing sight of the financial feasibility of the development.**