

Executive Summary

The purpose of the Sugarcreek Township and Bellbrook Safe Routes to School Engineering Study is to improve the safety and ability of students to walk and bike to Stephen Bell Elementary School, Bell Creek Intermediate School, and Bellbrook Middle School through the implementation of infrastructure improvements within a two mile trip of the schools.

In order to fulfill this purpose, effective solutions must address the following needs:

- enhance connectivity for pedestrians and cyclists between neighborhoods and the schools;
- correct existing pedestrian and bike deficiencies along key routes;
- promote a healthier lifestyle for the students of Sugarcreek Township and Bellbrook

The existing conditions surrounding each school were first investigated in order to identify the primary barriers to safe walking and biking. The areas of greatest concerns at Stephen Bell are the lack of safe crossings of State Route (SR) 725 and the lack of sidewalks along the streets to the south and west of the school. Bell Creek Intermediate School has the largest number of walkers and bikers as it is well connected to the Kable's Mill subdivision. Concerns at this school include connectivity to the bike path along Upper Bellbrook Road and improved access to the southern portion of Kable's Mill. Bellbrook Middle School is located along Feedwire Road and lacks any pedestrian or bike access. The need for connections to the neighborhoods west of the school along Feedwire Road, as well as to Bellbrook High School to the southeast, were expressed by members of the SRTS team.

Specific improvement suggestions were developed for each school with the goal of achieving the purpose and need of this planning project and addressing the identified concerns. The recommendations are grouped according to the priorities identified by the SRTS team and correspond to the general time frame in which they can feasibly be completed. They are divided into short-term (0-12 months), medium-term (1-3 years) and long-term (3+ years) solutions.

The short-term suggestions for Stephen Bell Elementary School focus on improving the safety of crossings and walking routes in close proximity to the school. The medium- and long-term solutions then focus on extending these routes further into neighborhoods around the school and across SR 725. The short-term solutions recommended for Bell Creek Intermediate School are fairly minor in scope, consisting of a crosswalk installation, connection to the existing bike path in front of the school, and better placement of the bike racks. The longer-term solutions are aimed at extending the bike path and improving connections and safety within and to the Kable's Mill neighborhood. Finally, the short-term improvements at Bellbrook Middle School are intended to "set the stage" for connections to the surrounding neighborhoods. Because significant investments will be required to connect the school to residential areas and the high school, it will likely take several years for these connections to be completed. The medium- and long-term solutions include numerous projects that will build on one another to incrementally create a complete SRTS network.

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Existing Conditions

In order to successfully identify, assess, and improve walking and biking routes to school, it is important to first “take stock” of the existing infrastructure and other conditions that affect the safety, comfort, and accessibility of those routes. Within Sugarcreek Township and the City of Bellbrook, the current pedestrian and bicycle conditions were documented through mapping, windshield surveys, and walking audits of the school premises and key routes to and from the schools. On June 4 and 5, 2009, the SRTS team members along with officials from the Ohio Department of Transportation (ODOT) and Stantec Consulting Services, Inc. met to discuss and observe the existing conditions around the schools.

On the morning of June 4th, the team first met at Bellbrook Middle School to observe the morning arrival pattern, then observed arrival at Bell Creek Intermediate School. Following the morning observations, the group convened at the Sugarcreek Township Administration Building to discuss the existing walking and biking conditions surrounding these two schools, as well as Stephen Bell Elementary School. Looking at the attendance boundaries and GIS mapping obtained from Greene County, the SRTS team identified the key areas of concern and determined the routes to be observed during the walk audits to follow. The discussion reaffirmed that the primary areas of concern are Feedwire Road, Upper Bellbrook Road, and SR 725.

In addition to discussing concerns and planning the walk audit route, the group also discussed upcoming projects that may impact or compliment the engineering improvements recommended in this plan. Identifying such projects is important to ensure that the SRTS efforts can be coordinated with and build upon other efforts being undertaken by the City and other agencies. The identified future projects include:

- Intersection improvements at the Carpenter Road/Alpha Bellbrook Road intersection, including reconstruction of Carpenter Road for approximately 1,000 feet west of the intersection – right of way acquisition for the project has begun
- Repaving of Belleview Drive – date yet to be determined

Following the meeting, the team performed field observations on the area surrounding Bellbrook Middle School. On June 5th the team met again and observed arrival at Stephen Bell Elementary School and then conducted walk audits around Stephen Bell and Bell Creek Intermediate School.

General Observations

Due to the proximity of Bell Creek Intermediate School and Bellbrook Middle School the SRTS areas for these schools have some overlap. However, because the routes students take to and from the schools differ, it was important to perform individual walk audits for each. This allowed the team to not only evaluate the condition of pedestrian and bicycle facilities surrounding the schools, but also to better evaluate the safest and most efficient routes for students to take to and from each school.

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The following sections will focus on the barriers to pedestrian and bicycle travel at each of the three schools as discussed by the SRTS team and observed during the walk audits. However, some barriers were consistently present throughout the entire SRTS area and will need to be addressed on a broader scale. The transitioning nature of the Township and parts of Bellbrook from rural to suburban development has led to the creation of numerous new residential subdivisions. While the internal streets in most of these new subdivisions include pedestrian facilities, the developments themselves lack connectivity between one another and to public facilities such as schools and parks, particularly along main roads. This development style provides limited options for students walking and biking to school, and therefore presents challenges in identifying viable safe routes.

The second barrier that was observed throughout the SRTS area was insufficient sidewalk widths. Many of the existing sidewalks are four feet wide (Figure 1), which fails to meet federal and state design standards that call for a minimum of five-foot wide sidewalks. More importantly, sidewalks this narrow prevent two people from comfortably walking side-by-side and do not provide adequate passing space for pedestrians walking in opposite directions. The recommendations in this report will focus on installing sidewalks along key routes where none currently exist. However, when new sidewalks are constructed and old sidewalks replaced, they should be constructed per current federal standards.

Figure 1: Sidewalk on Sugar Run Trail



Stephen Bell Elementary School

Of the three schools included in this School Travel Plan, Stephen Bell Elementary is the best situated to encourage students to walk and bike to school. It is located in an entirely residential neighborhood and fronts on two low-speed, low-volume streets. This means that many of the students that live in close proximity can access the school using only residential streets. Additionally, the on-site sidewalks and circulation pattern for buses and parents effectively separates pedestrians from vehicles. Despite being conducive to active transportation, Stephen Bell has very few walkers and bikers. During the field observation and walk audit, one student was observed walking to school with family members and one student was observed biking to school with a parent. The student who biked to school left his bike secured along the playground fence because the school does not have any bike racks.

Currently there is a 20mph school zone on North Linda Drive that extends approximately 300 feet beyond either end of the school property that is marked by signs. There is also a 20mph school zone on Shadowleaf Drive that extends approximately 250 feet north of the school property and approximately 700 feet south of the school property and is also marked with signs. The distance the school zone extends south of the school property raises concerns because it is not in compliance with the Ohio Revised Code (ORC), which states that the maximum distance a school zone may extend beyond the school property line is 300 feet, and that is only with special permission from ODOT. This non-compliance could potentially invalidate enforcement efforts

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aimed at controlling vehicle speeds. Additionally, if a school zone is perceived by drivers to be excessive in length, they are less likely to comply with the lower speed, thereby reducing safety for students walking and biking to school.

As stated earlier in the plan, the neighborhoods to the south and west of the school are older (built in the 1950's) and lack pedestrian facilities. However, the modified grid network and narrow street widths (20-22 feet) create easy access and control vehicle speeds, making this area conducive to multi-modal travel once facilities are constructed. Conversely, the 1980's – 2000's developments to the north and east of the school do contain sidewalks that are predominantly four feet in width. Despite the presence of these pedestrian facilities, the loop and cul-de-sac design, wide street widths (24-26 feet), and large intersection turning radii in these subdivisions discourage pedestrian and bike travel by creating more circuitous routes, longer crossing distances, and allowing for higher vehicle speeds. The two intersections of Sugar Run Trail and Shadowleaf Drive are of particular concern because students walking from east of the school must cross at one of these two intersections. Because of the overly wide streets and large turning radii, a pedestrian must walk nearly 50 feet to cross one of these residential two-lane roads. This creates unnecessary exposure for pedestrians using these intersections, increasing the likelihood of a crash, particularly on Sugar Run Trail where there are no traffic control devices.

State Route 725, located one block south of the school, presents a significant barrier to walking and biking for students who live in the residential neighborhoods south of the road. SR 725, classified by ODOT as a rural minor arterial, is a three-lane roadway with a posted speed of 35mph. There is a ten-foot wide bike path that runs along the north side of the road (Figure 2), but the nearest marked pedestrian crossing of SR 725 is at Lakeman Avenue, nearly one-half mile west of Stephen Bell Elementary. The intersection of SR 725 and South Linda Drive is signalized, but currently does not have crosswalks.

Figure 2: Bike path along SR 725



Possum Run, a tributary to Little Sugar Creek, is located just northeast of the school and presents another potential barrier to students walking and biking to school. Currently, Belleview Drive is the only street near the school that crosses this stream. However, there are also easements between residences on either side of Possum Run at Glen Berry Circle and at Shadowleaf Drive. There is currently a short section of sidewalk on each side of the stream, but neither extends across the stream to create a through route. These easements could provide much needed connectivity between the school and residences to the north of the stream, putting nearly 100 more homes within a half-mile walk and the entire residential area within approximately one mile of the school.

Bell Creek Intermediate School

Bell Creek Intermediate School sits on the south side of the Sugarcreek Local School District academic campus on Upper Bellbrook Road just north of downtown Bellbrook. The campus also includes the school district athletic facilities, the district transportation building, and

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Bellbrook High School. Upper Bellbrook Road is classified by ODO T as a major collector road and has a posted speed limit of 50mph. A 20mph school zone extends the length of the school campus on Upper Bellbrook Road and is designated by signs and flashers at the northernmost drive to the high school and the southernmost drive to the intermediate school.

Figure 3: View of bike path from south driveway of school



While the school is located on a high speed and fairly high volume roadway, it is relatively well connected to nearby residential areas, including the homes near downtown Bellbrook to the south and the Kable's Mill subdivision to the northeast, as is evidenced by the large number of students who walk and bike to the school. The Richard L. Frederick Bikeway runs along the east side of the road, from downtown Bellbrook to the south drive of Bell Creek Intermediate School (Figure 3). This path provides a safe, separate facility for pedestrians and cyclists traveling to the school from the south; however, it currently ends at the driveway and does not extend to the school building. To the north of the school property the path picks back up for approximately 250 feet, extending from the water tower to the intersection of Feedwire Road.

The Kable's Mill subdivision is connected to the school campus via a sidewalk between Rose Lake Drive and the athletic fields north of the high school (Figure 4). During the field observation and walk audit this route was heavily used by students walking and biking to the intermediate school. This sidewalk is effective in connecting the school campus to the neighborhood, but it is not ideally situated for students attending the intermediate school. The path is located to the north of the high school and, as mentioned earlier in the plan, does not connect to the intermediate school. This location forces students who live in the southern portion of the subdivision to walk north, away from the school, to access the path. Once on school property, students pass through a series of driveways, parking lots, and service drives to reach the intermediate school (Figure 5). Concerns were expressed by members of the SRTS team regarding potential conflicts with vehicles at the high school and with buses entering and exiting the transportation lot at the back of the property. Additionally, the bike racks, which are heavily used at Bell Creek, are located up against a fence behind the school and are not on a paved

Figure 4: Path connecting Kable's Mill subdivision to school property



Figure 5: Students approaching the school from Kable's Mill



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surface. At a minimum, the racks should be turned around so that the bar across the bottom of the rack, which is intended to help secure the tires to prevent bikes from rolling or tipping over, can be used. More importantly, the racks should be located on a paved surface and in a location with good surveillance to minimize vandalism and theft.

Within the Kable's Mill subdivision all of the roads are low volume, residential in nature, and include pedestrian facilities. The streets are 22 feet wide, but they have rolled curbs, which are wider and flatter than standard curb and gutter and can be parked on by vehicles. This effectively adds 1 ½ – 2 feet to each side of the street, creating a 25-26 foot wide road instead of

Figure 6: Overly wide residential street in Kable's Mill



the desirable 20-22 feet (Figure 6). A daytime parking restriction has also been implemented on Rose Lake Drive to prevent high school students from parking in the neighborhood and walking to the school. One by-product of this parking restriction is that the traffic calming effect of on-street parking is eliminated on this road. The wider than necessary streets, low traffic volumes, and lack of on street parking (whether by restriction or lack of necessity) in Kable's Mill create conditions where speeding is more likely, a concern that was echoed by the SRTS team particularly with regard to teenage drivers.

Bellbrook Middle School

Bellbrook Middle School is situated in a large open field just west of Alpha Bellbrook Road. The school property is bordered by Feedwire Road on the south and Carpenter Road on the north. There is an access drive on the west side of the school building that runs the length of the property and provides access from Feedwire and Carpenter Roads. Carpenter Road is a very narrow, low-volume road and vehicular access to the grounds is often prohibited at the north end of the drive. The main vehicular access point is at Feedwire Road which is classified by ODOT as an urban collector and has a speed limit of 45 mph (Figure 7). A 20 mph school zone is designated by flashers that are located approximately 300 feet to the east and west of the school property line.

Figure 7: Congestion along Feedwire Road at entrance to Bellbrook Middle School



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Several subdivisions, including Deerfield Estates, Eden Meadows, and East of Eden, are located west and southwest of the middle school along Feedwire Road and the Kable's Mill subdivision is to the east of Upper Bellbrook Road. While each subdivision has sidewalks throughout, none of these neighborhoods have pedestrian connections to the school grounds. Feedwire Road is a high-speed, high-volume roadway with no pedestrian facilities, making walking and bicycling from any of the surrounding neighborhoods to Bellbrook Middle School extremely dangerous for students (Figure 8).

Figure 8: Pedestrians walking along Feedwire Road from Bellbrook Middle School



During the field observation, members of the SRTS team mentioned that students from Bellbrook Middle School travel to Bellbrook High School for classes and school athletics practices. Currently, students must walk along Feedwire Road or cut through private property to reach the Feedwire Road/Upper Bellbrook Road/Pine Court intersection. This intersection currently has a marked crosswalk only on the east leg, and does not contain any pedestrian signals or push buttons. To the south of Feedwire Road, there is an asphalt path that extends along the east side of Upper Bellbrook Road for approximately 250 feet to the water tower, but this path currently ends at the northern property line of the school campus. Vehicle speeds along these two roads and the volumes at the intersection make this a dangerous route for students to travel without the implementation of infrastructure improvements.

Assessment of Accident Data

A review of ODOT crash data for the latest available three year period (2005 to 2007) shows that six crashes involving pedestrians and/or bikes occurred within the SRTS area for the three schools being studied. Three of these crashes resulted in injuries, two involved only property damage, and one crash, in which a pedestrian was struck by a vehicle, resulted in a fatality. Three of the six crashes involving pedestrians or bikes occurred on Wilmington Pike, a heavily traveled arterial roadway, and each resulted in an injury or fatality. This road consists primarily of retail development and is not an appropriate route for students to travel to school. The other three crashes occurred in various locations throughout the SRTS area; however, none are along recommended walking routes.

While there have not been any recorded pedestrian or bike crashes in the past three years along the school travel routes, this is not necessarily an indication that conditions surrounding the schools are ideal for pedestrians and cyclists. Given the proximity of each school to high-speed roads and the need for better connected pedestrian and bike facilities, the lack of crashes is more likely evidence that few students currently walk and bike to school. Through a successful combination of infrastructure improvements and encouragement, education, and enforcement

efforts, we can expect to see an increase in the number of students walking and biking, and at the same time maintain the low number of pedestrian and bike related crashes.

Improvement Suggestions

The engineering improvement suggestions provided to the SRTS Team Members aim to reduce vehicle speeds, establish safer crossings, and improve pedestrian and bike facilities within a two-mile trip of Stephen Bell Elementary, Bell Creek Intermediate, and Bellbrook Middle Schools. Specific improvement suggestions were developed with the goal of achieving the project Purpose and Need. The recommendations are grouped according to a general time frame in which treatments should be completed. They are divided as follows:

- Short-Term 0-12 Months
- Medium-Term 1-3 Years
- Long-Term 3+ Years

Wherever possible, sidewalks and bike facilities should be constructed as a part of every future capital road improvement project to help increase opportunities for students to walk and ride to school. The incorporation of “Complete Streets” principles in Township and City projects is also recommended to help ensure that all users of the transportation network are appropriately considered and safely accommodated in future improvements. Additionally, it is recommended that projects be constructed with minimum sidewalk widths of five feet and a minimum shared use path widths of 10 feet for all new and replacement facilities to conform with current state and federal standards.

Sugarcreek Township is fortunate to have an active Open Space Advisory Committee that is planning for future shared use path connections that will substantially increase access for pedestrians and cyclists throughout the area, including students traveling to and from school. Some of these planned routes include a path along the utility easement just east of Eden that connects Feedwire Road to Little Sugar Creek Road, as well as an east/west path through a future development across Upper Bellbrook Road from Bell Creek Intermediate School. While these are important pedestrian and bike connections and may well serve as routes to and from school for students, they are broader in scope and more appropriately addressed in an open space or greenways plan. The recommendations that follow in this section are more narrowly focused, identifying individual improvements along specific routes to and from the schools.

Perceived and/or real safety issues may be minimized by instituting education, enforcement and encouragement programs along identified SRTS routes and around the school property. Drop off and pick up policies should continually be monitored for safety and effectiveness and enforced with a reasonable level of effort. Encouragement programs can include a Walk/Bike to School Day or a walking school bus and should be implemented in conjunction with infrastructure improvements. Such programs would ideally be organized by members of the SRTS team, involved parents, and school staff.

The following improvement suggestions provide Sugarcreek Township and the City of Bellbrook with a range of possible improvements so that projects may be prioritized and budgeted accordingly. Cost estimates are for planning purposes only and should not be considered detailed engineering cost estimates.

Stephen Bell Elementary School

Short-Term (0-12 Months)

1. Install bike racks to encourage students to cycle to school. The racks should be situated on a paved surface in a convenient, well-monitored location. Care should be taken in selecting the location and style of rack. The U-rack shown in Figure 9 is preferable to a traditional “fence style” rack which can cause damage to bikes if they fall over or if the rack becomes crowded. Estimated Cost: \$2,500.00 for five U-racks



2. Improve the safety of the intersections at which students are encouraged to cross. Install stop bars, high intensity (ladder style) crosswalk markings, and improved pedestrian signage at the two Sugar Run Trail/Shadowleaf Drive intersections, and the Bellview Drive/North Linda Drive intersection (Figure 10). Estimated Cost: \$12,000 (\$3,000 per intersection)



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3. Move the school zone signs on Shadowleaf Drive to within 300 feet of the school property line and install school zone pavement markings. Moving the signage to a proper distance from the school will ensure that the 20mph speed zone is enforceable and will improve driver compliance by not reducing speeds for unnecessary distances. Estimated Cost \$1,000
4. Install a crosswalk on North Linda Drive at the south entrance to the school. The crosswalk should consist of high visibility pavement markings and signage alerting motorists to the presence of pedestrians (Figure 10). Estimated cost \$3,000
5. Extend sidewalk on the south side of North Linda Drive from the end of the existing sidewalk to Belleview Drive (approximately 260 linear feet (LF)). Estimated Cost: \$32,000
6. Extend sidewalk on both sides of Sugar Run Trail from the end of the existing sidewalk to the bike path running along the north side of SR 725 (approximately 200 LF) on the west side and 80 LF on the east side. Estimated Cost: \$26,000

Medium-Term(1-3 Years)

1. Extend the path at the end of Glenberry Circle across Possum Run to connect with the path at the end of Shadowleaf Drive. This will create a direct connection to the school from the neighborhoods to the north and east of Possum Run. Estimated Cost: \$250,000

Figure 11: Flashing overhead crosswalk signs



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2. Create a pedestrian crossing at the SR 725/South Linda Drive intersection to connect the neighborhoods south of SR 725 to the bike path on the north side of the road. Install pavement markings and pedestrian actuated overhead crosswalk signage (Figure 11) to heighten the visibility of pedestrians crossing at this location. Estimated cost \$30,000

3. Install curb extensions at the intersections of Shadowleaf Drive and Sugar Run Trail and at the intersection of Sugar Run Trail and North Linda Drive (Figure 12). This will shorten the crossing distance for pedestrians and help to control vehicle speeds by narrowing the lane widths and tightening the turning radii to a more appropriate size for residential streets. Estimated Cost: \$64,000 (\$8,000 per curb extension)

Figure 12: Intersection curb extensions



4. Install sidewalk on the east side of Belleview Drive from SR 725 to Whites Drive. In order to install the sidewalk, the project would also consist of replacing the existing ditch with curb and gutter and closed drainage along the east side of Belleview Drive. This improvement would be approximately 1,900 LF and constitutes Phase 1 of construction of sidewalk along the entire length of Belleview Drive. Estimated Cost: \$250,000

Long-Term (3+ Years)

1. Install Phase 2 of sidewalks on the east side of Belleview Drive from White Drive to Tareyton Drive. As with the first phase, this would include the installation of curb and gutter and closed drainage in addition to the sidewalk (approximately 1,900 LF). Estimated Cost: \$250,000
2. Complete sidewalk network in the neighborhood to the west of Stephen Bell Elementary School
 - a. North Linda Drive – south side of road from SR 725 to Belleview Drive (approximately 1,300 LF). Estimated Cost: \$125,000
 - b. Sugarcreek Drive – from the end of the existing sidewalk to Belleview Drive on both sides of the road (approximately 1,450 LF). Estimated Cost: \$250,000

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- c. Weller Street – both sides of the road from Bledsoe Drive to Belleview Drive (approximately 1,200 LF). Estimated Cost: \$230,000
- d. White Drive – both sides of the road from Bledsoe Drive to Belleview Drive (approximately 1,200 LF). Estimated Cost: \$230,000
- e. Wood Acre Drive – both sides of the road from Bledsoe Drive to Belleview Drive (approximately 1,200 LF). Estimated Cost: \$230,000
- f. Bledsoe Drive from Sugarcreek Drive to existing sidewalk on both sides of the road (approximately 1,750 LF). Estimated Cost \$300,000

Bell Creek Intermediate School

Short-Term (0-12 Months)

1. Move the existing bike racks onto a paved surface in the fenced parking lot near the north entrance to the school. This will place the racks in a convenient, well-monitored location. Additional bike parking may also be necessary as the existing racks were near capacity during field observations (Figure 13). The U-rack shown in Figure 9 is preferable to the traditional “fence style” rack currently at the school, which can cause damage to bikes if they fall over or if the rack becomes crowded. Estimated Cost: \$2,000
2. Connect the Richard L. Frederick Bikeway to the school’s internal sidewalk network by extending a path along the south side of the entrance drive to the school. Because the southern drive to the school is a 22-foot wide one-way entrance, it could be narrowed by 8-10 feet to provide room for the path on the existing asphalt. A curb would then be constructed to separate entering vehicles from pedestrians and cyclists. An alternative option would be to construct a new sidewalk segment approximately 230 feet in length along the south side of the drive. However, this option would likely require an easement or property acquisition from the church to the south of the school. Estimated Cost: \$4,000 using existing pavement with a new curb; \$10,000 for a new sidewalk connection
3. Install a crosswalk on Rose Lake Drive at the path to the school property. The crosswalk should consist of high visibility pavement markings and signage alerting motorists to the presence of pedestrians. Estimated Cost \$1,000
4. Construct a ten-foot asphalt bike path from the south end of Rose Lake Drive to the school property, through Section Eight of the Kable’s Mill subdivision. This will create a more direct connection for students living in the southern and eastern portions of Kable’s Mill. During the walk audit, the SRTS team observed students using this route to access the school property despite the current lack of a pathway. The preliminary site plan for Section Eight should be revised to provide an easement for the path on the east or west side of lot 250. The path should then follow the northern property line of the school until

Figure 13: Existing bike racks near capacity at Bell Creek Intermediate School



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joining the existing sidewalk and crosswalk at the drive to the school bus parking lot (approximately 900 LF of asphalt path). Estimated Cost \$29,000

Medium-Term (1-3 Years)

Extend the Richard L. Frederick Bikeway across the front of the school property to connect with the existing section of path that ends at the water tower just north of the school campus (approximately 2,400 LF of asphalt path). In conjunction with other infrastructure improvements discussed below for Bellbrook Middle School, this path will provide a safe route for students living in subdivisions northwest of the intermediate school. Estimated Cost: \$67,000

Long-Term (3+ Years)

1. Install curb extensions at the intersections of Heritage Trace Drive with Amberwood Court, Avonley Court, and Seton Hill Drive and at the intersection of Rose Lake Drive with Katerina Court. Additionally, curb extensions should be placed on either side of Rose Lake Drive at the existing path to the school property. The curb extensions will control vehicle speeds by narrowing the roadway and improve pedestrian safety by shortening crossing distances. Estimated Cost: \$96,000 (\$8,000 per curb extension)
2. Install mini circles at the intersections of Heritage Trace Drive with Kables Mill Drive and Rose Lake Drive (Figure 14). Similar, but smaller in size, to roundabouts, mini circles improve intersection safety by slowing vehicle speeds to 10-15mph and circulating all vehicles through the intersection in the same direction, eliminating many potential conflicts for cars and pedestrians. They will work in conjunction with the curb bulbs to effectively control vehicles speeds along Heritage Trace and Rose Lake Drives. Mini circles are also relatively inexpensive as they can generally be constructed without altering the existing intersection geometry. Finally, landscaped mini circles and curb bulbs both improve aesthetics, and particularly at the Heritage Trace Drive/Kables Mill Drive, can serve as a gateway feature to the neighborhood. Estimated Cost \$30,000 (\$15,000 per intersection)

Figure 14: Mini circle



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Bellbrook Middle School

Short-Term (0-12 Months)

1. Install bike racks to encourage students to cycle to school. The racks should be situated on a paved surface in a convenient, well-monitored location. Care should be taken in selecting the location and style of rack. The U-rack shown in Figure 9 is preferable to a traditional “fence style” rack which can cause damage to bikes if they fall over or if the rack becomes crowded. Estimated Cost: \$5,000.00 for ten U-racks

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2. Construct a sidewalk along the east side of the main school drive from Feedwire Road to the Bellbrook Middle School building (approximately 1,300 LF). This improvement will also require crosswalk pavement markings at the two parking lot drives at the school.
Estimated Cost: \$44,000
3. Upgrade the pedestrian facilities at the Feedwire Road/Upper Bellbrook Road/Pine Court intersection. Install pedestrian signal heads, pushbutton activators, and crosswalk markings on all four legs of the intersection. Estimated Cost: \$60,000
4. Construct a ten-foot asphalt bike path along the south side of Feedwire Road from the school driveway to Upper Bellbrook Road (approximately 1,200 LF). Construction of the path may require lengthening a culvert or bridging the stream approximately 300 feet west of Upper Bellbrook Road. Estimated Cost: \$50,000
5. Create a pedestrian crossing on Feedwire Road on the east side of the school driveway. In conjunction with the new sidewalk to the school and path on the south side of Feedwire Road, this improvement will create a complete route for students traveling between Bellbrook Middle School and Bellbrook High School for classes and athletics. The crossing should consist of high visibility pavement markings and pedestrian actuated overhead crosswalk signage (Figure 11) to heighten the visibility of pedestrians crossing at this location. Estimated cost \$30,000

Medium-Term (1-3 Years)

Construct a sidewalk along the east side of the northern school drive from Carpenter Road to the Bellbrook Middle School building (approximately 1,000 LF). A crosswalk will also be required across the entrance to the bus parking lot on the north side of the school. Estimated Cost: \$40,000

Long-Term (3+ Years)

1. Construct a ten-foot asphalt bike path along the south side of Feedwire Road from Eden Meadows Way to the school driveway (approximately 1,600 LF). This section of path will require the installation of a crosswalk at Adams Place and may also necessitate lengthening a culvert or bridging the stream located just west of the school drive.
Estimated Cost: \$44,000
2. Install a crosswalk on Feedwire Road at the Roger Scott Drive/Eden Meadows Way intersection. This will connect students living in the Deerfield Estates subdivision to the new path on the south side of the road. The crosswalk should consist of standard pavement markings and signage alerting motorists to the presence of pedestrians. Advance signage may be necessary at this location due to vertical curves on Feedwire Road to the east and west of the intersection (Figure 15). Estimated Cost \$10,000

Figure 15: Advance pedestrian warning sign



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3. Construct sidewalk along the south side of Carpenter Road from Glory Drive to Upper Bellbrook Road. This project could be divided into the following two phases:
 - a. Glory Drive to the school drive, which creates a walking route from Deerfield Estates along a low volume roadway (approximately 1,350 LF). Estimated Cost: \$45,000
 - b. School drive to Upper Bellbrook Road. This section could be completed as part of the upcoming Upper Bellbrook Road/Carpenter Road intersection improvement project (approximately 2,400 LF). Estimated Cost: \$79,000

4. Construct a ten-foot asphalt bike path along the south side of Upper Bellbrook Road from the Feedwire Road/ Upper Bellbrook Road/Pine Court intersection to Kables Mill Drive (approximately 1,850 LF). This section of path will provide residents of Kable's Mill with a walking/biking route to the middle school. Estimated Cost: \$60,000

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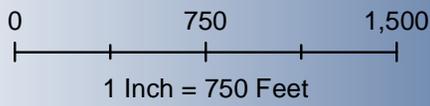
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2007, Location and Design Manual, Volume One, Roadway Design, ODOT

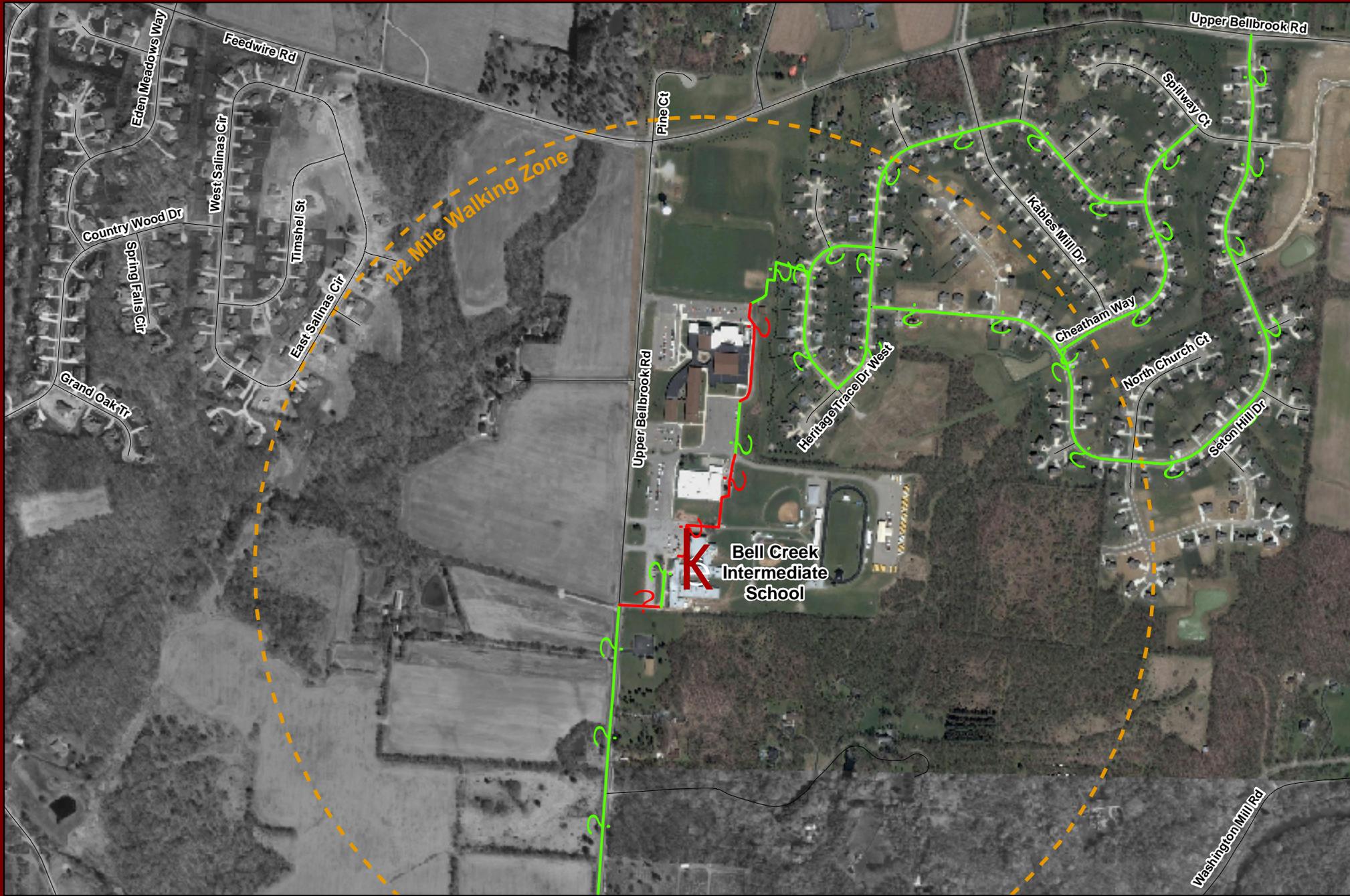


Recommended SRTS Routes

- ? Walking Route with Sidewalk
- ? Walking Route Without Sidewalk



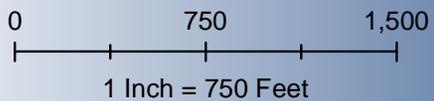
Stephen Bell Elementary School
 Safe Routes to School
 Walking Route Map



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Recommended SRTS Routes

- ? Walking Route With Sidewalk
- ? Walking Route Without Sidewalk

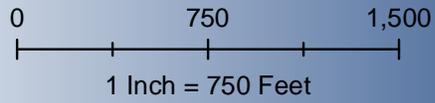


Bell Creek Intermediate School
 Safe Routes to School
 Walking Route Map



Recommended SRTS Routes

- - ? Walking Route With Sidewalk
- - ? Walking Route Without Sidewalk

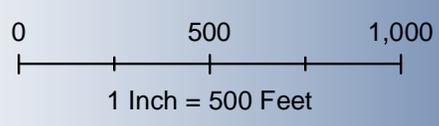


Bellbrook Middle School
 Safe Routes to School
 Walking Route Map



Recommended Improvements

-  Bike Rack
-  Crosswalk and Signage
-  Curb Extensions
-  School Zone Sign
-  Sidewalk
-  Shared Use Path

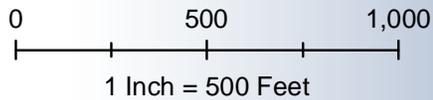


Stephen Bell Elementary School
 Safe Routes to School
 Recommended Improvements Map



Recommended Improvements

- X Bike Rack
- W Crosswalk and Signage
- J Curb Extensions
- H Mini Circle
- Sidewalk
- - Shared Use Path

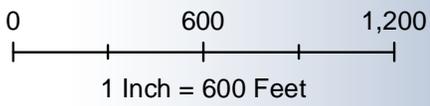


Bell Creek Intermediate School
 Safe Routes to School
 Recommended Improvements Map



Recommended Improvements

-  Bike Rack
-  Crosswalk and Signage
-  Sidewalk
-  Shared Use Path



Bellbrook Middle School
 Safe Routes to School
 Recommended Improvements Map