



Coalition for a Tobacco Free Palau and Ulkerreuil A Klengar

COMPLETE STREETS IN PALAU

Report on a Week-Long Focus on Complete Streets

November 10-14, 2014

Michael Moule, PE

Table of Contents

	Page
Summary of Events	1
Walk Audits	1
Meetings and Presentations	7
Recommendations.....	19
Policy Recommendations.....	19
Short term Infrastructure Recommendations.....	21
Long Term Infrastructure Recommendations	28

SUMMARY OF EVENTS

During the week of November 10-14, 2014, Michael Moule facilitated and presented at a series of meetings and events as follows:

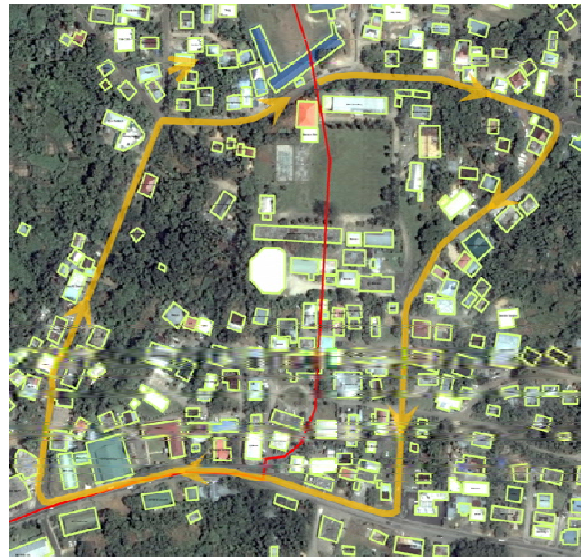
WALK AUDITS

Michael Moule led a series of Walk Audits at various locations in Palau, attended by elected officials, residents, school officials, and other stakeholders. These walk audits served multiple purposes. First, the walk audits gave Michael an opportunity to see and experience the walking and bicycling environment on streets and sidewalks in Palau. Second, the walk audits provided an opportunity for the local stakeholders to describe their concerns and the challenges for traveling in Palau by all modes. Third, Michael and the stakeholders used the walk audits to brainstorm solutions for creating walkable environments and complete streets in Palau.

Walk Audits were conducted at several locations as discussed below

Ngerchemai-Iyebukl

This walk audit took place on Monday, November 10, and started and finished at G. B. Harris Elementary School. About 20 people attended the walk audit, including school principal Wicliff Emul, Ngerchemai Legislator Job Kikuo, Iyebukl Legislator Devon Andreas, teachers, parents, and representatives of CTFP and UAK. Starting from the school, the audit route went east along the road in front of the school, turned right (south) to follow the road past Emmaus High School to the Mobil Station, turned right (west) along the main road in Koror past Mindszenty High School, turned right (north) at Island Mart, and turned right (east) back to G. B. Harris Elementary School.



Ngerchemai-Iyebukl walk audit route

The issues and concerns discussed during this walk audit were as follows:

- No space for sidewalks
- Motorists overtake pedestrians leaving very little space.
- No bike lanes
- Crosswalks exist across the main road in Koror, but they are challenging to use safely and not always located where people prefer to cross.
- Parents drop students off in the middle of the road at G. B. Harris Elementary



Walking along the road between Island Mart and G.B. Harris Elementary School

Report on a Week-Long Focus on Complete Streets in Palau
Coalition for a Tobacco Free Palau and Ulkerreuil A Klengar

- Drainage ditches narrow the road and create a potential trip-and-fall hazard for pedestrians, especially kids walking to school.
- Some students found their way through the Emmaus High School campus to take a shorter route toward the Mobil Station.
- The sidewalk formed by the covered ditch on the main road serves pedestrians better than the previous condition of an open ditch, but the drainage infrastructure creates some challenges, as seen in the example image at right.



Inlet interrupts sidewalk along the Koror main Road

The following solutions were discussed during this walk audit:

- Open the rear gate of Emmaus High School during arrival and dismissal times for G. B. Harris Elementary School. This would formally allow students to take a shorter route to and from school, avoiding about 400 meters of travel along narrow streets.
- Provide education for parents and other drivers about driving safely near the school.
- Provide education for students about walking safety
- Fill or cover the drainage ditches to reduce hazards and potentially provide additional space for walking.
- Make the street in front of G. B. Harris Elementary School a one-way street in the westbound direction. The one-way street could be either full-time, or just during arrival and dismissal times (7:00 to 8:00 and 14:00 to 15:00).
- Remove the centerline markings on the secondary roads, in order to encourage drivers to give more space to pedestrians when overtaking.
- Mark an “advisory” (dashed) pedestrian lane on the secondary roads, to provide dedicated space for pedestrians.

Bethlehem and Palau Community College Area with Omekesang

This walk audit took place on the evening of Monday, November 10 at about sunset, beginning and ending at the Omekesang office. About 10 people attended this walk audit, including several people with disabilities. Three attendees use manual wheelchairs; due to the extent of their disabilities and the challenging environment for wheelchair users, the wheelchairs were pushed by other attendees. One attendee is blind, and she was guided by another participant. The audit route followed the road from the Omekesang office to the main road near the post office, turned left (west) near Bethlehem, crossed the main road at Bethlehem to the PDC Building, continued west on the north side of the main road past Palau Community College, crossed the main road to the Mobil Station, continued east on the south side of the main road through Bethlehem, and returned back to the Omekesang offices.



Omekesang walk audit route

Report on a Week-Long Focus on Complete Streets in Palau
Coalition for a Tobacco Free Palau and Ulkerreuil A Klengar

The issues and concerns discussed during this walk audit were as follows:

- No sidewalks on the secondary roads.
- Along the main road, the sidewalk formed by the covered ditch has openings, which create challenges for people with disabilities, including both wheelchair users and people who are blind.
- There are very few ramps providing sidewalk access at driveways and crosswalks.
- Sidewalks are often rough and very uncomfortable for wheelchair users.
- A reconstructed ramp and stairway were under construction at the crosswalk across the main road at Bethlehem. At the time of the walk audit, there was a hole in the ramp where a street light had been, blocking the group's access to the crosswalk. But later in the week this hole was filled, resulting in a sufficient ramp for access to the crosswalk.



Crosswalk without sidewalk ramps

Babeldaob

On Tuesday, November 11, Michael Moule and Judy Otto went to the following communities in Babeldaob to observe existing conditions for walking and bicycling, and brainstorm ideas for recommendations within these communities.

Aimeliik

Michael and Judy met Aimeliik Governor Leilani Reklai at the site of the proposed Tebadel subdivision. The subdivision is fairly small (about 20 houses planned). Due to topography, the subdivision is proposed with one somewhat circuitous road leading up to the houses. The discussion during the visit centered around trying to provide additional connectivity for people walking from the subdivision, by building walking paths that provide shorter routes than the circuitous road.



Visualizing the future subdivision in Aimeliik

Airai

Michael and Judy observed children walking home from Airai Elementary School along neighborhood streets near the school, and they observed children being dropped off by the school bus along the main road to the airport.

Report on a Week-Long Focus on Complete Streets in Palau
Coalition for a Tobacco Free Palau and Ulkerreuil A Klengar



Children walking home from
Airai Elementary School



Children walking along the main road to the
airport after being dropped off by the bus

Ngardmau

Michael and Judy visited Ngardmau to look at an example of a community with walkways along the secondary roads. People were observed comfortably walking on walkways separated from the roadway by a raised concrete curb



Street in Ngardmau with curb-separated sidewalk

Melekeok

Michael and Judy met with members of the Melekeok Healthy Lifestyles Working Group (appointed by the Governor and the Reklai) in the summerhouse across from the Melekeok State Office. This visit included a brief tour of one of the stone paths to Bai Melekeong, evidence that Palau has not always been dominated by cars. The group also toured Melekeok's main road, which has an existing walkway that serves pedestrians well and a wide roadway with low traffic volumes on flat terrain, making bicycling a convenient and comfortable way to move around town. In the meeting following the walk audit, everyone agreed that the environment for walking and bicycling is good within Melekeok, but most adults choose to take cars, even for short trips within the community, including driving children to and from the elementary school. Note that Melekeok School has adopted a "Walk to School" policy that eliminates busing within the community and encourages children to walk. Although the PTA has endorsed this policy, many parents drive their children to school. On the other hand, high school students who live in Melekeok often walk from the bus stop on the Compact Road, past the Palau Capitol Building, to the Melekeok community.



Wide street in Melekeok with separated sidewalk

Malakal

On Wednesday, November 12, Michael Moule and Judy Otto went with Ben Asuncion, Senior Project Manager of the National CIP office to the road that leads to the Malakal Quarry. Unlike most streets in Palau, this street has curbs and gutters instead of deep drainage ditches. The design includes space for a sidewalk outside of the street, within the public right-of-way. The sidewalk has not been constructed at this time, but it would be fairly easy to add a sidewalk between the curb and the property line. A hotel has been proposed at the end of this road. As discussed under Policy Recommendations later in this report, sidewalk construction in this area could be required of the hotel developer, to provide better walking access to the hotel and other destinations on this road. As discussed under Long Term Recommendations below, a similar curb and gutter design with sidewalks could be a model for future streets in Palau.



Street in Malakal with curb and space for sidewalk

Many people (both local residents and tourists) were observed walking along the main road in Malakal, and on the causeway and bridges connecting Malakal to Madalaii. The causeways and bridges have some improved walking areas, but there are major gaps in the pedestrian network.

Meyuns

On Wednesday, November 12, Michael Moule and Judy Otto went with Ben Asuncion of the National CIP office to the main road through Meyuns leading to the Palau Pacific Resort. Traffic on this road travels at fairly high speeds, and people regularly walk along the road. This road has wide lanes that encourage fast driving speeds and leave very little room for pedestrians.



Main road in Meyuns

Idid

On Wednesday, November 12, Michael Moule met with Idid Legislator Kyonari Tellames to look at the secondary road that runs through Idid, parallel to the Koror main road. The discussion centered on ways to improve this road for pedestrians; a shared street environment was the primary solution discussed due to the narrow nature of the road and demand for parking. The offset intersection at the western edge of Idid Hamlet was also discussed, including the possibility of a double roundabout at this intersection. The roundabout was determined to be infeasible; the final recommended solutions are to remove vegetation that block the sight lines at the intersection and incorporate new speed bumps on the



Area observed in Idid

intersection approaches when the roads are resurfaced.

Central Koror

Michael Moule and Judy Otto visited Central Koror two different times. First, on Wednesday, November 12, they went with Ben Asuncion of the National CIP office to visit the area near WCTC and Surangel and Sons. On Thursday, November 13, a group of about 15 people from the design summit went on a walk audit around Central Koror. The walk audit route started at PNCC, traveled east along the main road, crossed the main road at the Post Office, turned right (south) and then left (east) to go past the Penthouse Hotel, turned left at Surangel's alley, crossed the main road again at the crosswalk at Surangel and Sons, followed the alley north past WCTC, turned left on Lebuu Street behind WCTC, and continued back to PNCC.



Central Koror walk audit route

The following issues and concerns were discussed during the visits to Central Koror:

- It is difficult to walk across the main road; sometimes drivers do not stop.
- The sidewalk formed by the covered ditch on the main road is better than the previous condition with an open ditch, but it is narrow and the slabs covering the ditch are not uniformly flat, have large gaps, and are sometimes poorly maintained, creating tripping and other hazards, especially in low light conditions.
- There are several buildings along the main road where vehicles are parked diagonally, blocking the sidewalk over the ditch.
- Lebuu Street and the road past the Penthouse Hotel are narrow and pedestrians must share the road with cars. Both roads carry a fair amount of traffic, especially Lebuu Street, making it difficult to share these streets.
- Some of the useful walking connections are actually on private property (for example the alleys adjacent to WCTC and under Surangel and Sons building).
- Some crosswalks across the main road have bushes and other items that create sight line problems.
- The crosswalks are primarily located at intersections where there are many turning conflicts. This was discussed with the counterpoint that intersections are often where pedestrians arrive at the street to cross, and are therefore a common place for crosswalks.

The following solutions were discussed during and after the visits to Central Koror:

- Move the crosswalk at Surangel a little to the west, this would better fit within the desire lines of pedestrians between Surangel and WCTC, and have fewer conflicts with parking maneuvers at private properties.
- Consider several possible enhancements to existing crosswalks, including moving the stop lines to be further in advance of the crosswalks, providing illumination, and providing flashing beacons.

Report on a Week-Long Focus on Complete Streets in Palau
Coalition for a Tobacco Free Palau and Ulkerreuil A Klengar

- Build a bridge connecting WCTC to Surangel and Sons. Someone mentioned that a bridge was proposed in the 1990s but was considered a potential eyesore.
- Develop a policy to maintain bushes at crosswalks in order to maintain good sight lines.
- Develop a covered walkway along the main road in Koror, as has been observed in Samoa. Everyone agreed that covered walkways would be a nice amenity, but there was also recognition that the expense makes implementation of covered walkways unlikely.
- Create a “downtown zone” where everyone is aware that there is a busy, pedestrian-oriented environment.
- Make Lebuu Street and the road past the Penthouse Hotel one-way streets, to make room for pedestrians. This would need to be studied in more detail to see how it would affect traffic circulation.
- Provide centralized metered parking near WCTC and Surangel and Sons.
- Consider reducing the 3-lane road to 2-lane road with bike lanes, to dis-incentivize driving and encourage bicycling and walking.

MEETINGS AND PRESENTATIONS

During the week, a series of meetings and presentations were organized in which Michael Moule introduced the complete streets concept and presented various approaches for applying the concept to Palau’s streetscapes. The presentations varied according to the audience and time allocated. They also evolved over the week. The early presentations used examples and pictures drawn primarily from the United States. As the week progressed, Palau-specific input was gradually integrated. All presentations covered similar key points.

- Complete streets are safe, comfortable, and convenient for everyone no matter who they are or how they travel. Incomplete streets are unsafe especially for older persons, people with disabilities, and children.
- Research shows that many people want to drive less and to have more transportation options.
- Research shows that many people are willing to walk or bike distances of 1-3 miles, a range that includes most trips in Palau. There is huge potential for converting these trips to foot or bike but to take advantage of this potential, people have to feel safe when walking and biking.
- Although there is widespread consensus that Palau’s streetscapes have improved in recent years, walkers and bikers here still face many challenges. Simply put, most of Palau’s streets have not been designed with adequate space for people. Where sidewalks exist, they are narrow and filled with obstacles. Street crossings are difficult. People with disabilities face special challenges.
- Complete streets can help address these challenges. This means that whenever there is a new project (new or rehabilitated roads), the right-of-way is planned, designed, constructed, operated, and maintained in a way to make it safe for all users regardless of how they travel.
- Complete streets bring many benefits:
 - Complete streets enhance safety, improve health, create more vibrant economies, reduce infrastructure costs, and result in lower emissions and cleaner air.
 - Complete streets create walkable communities which are happier communities where people are more socially engaged and trusting.
 - Complete streets are especially beneficial for older persons, children, and people with disabilities.

Report on a Week-Long Focus on Complete Streets in Palau
Coalition for a Tobacco Free Palau and Ulkerreuil A Klengar

- Experience shows that people will change their transportation habits – will walk and bike more - when streets are designed to be safe, convenient, and attractive. BUT there is no magic formula – no “one size fits all;” complete streets have to be designed to suit the particular context.
- Solutions for the Palau context include: paved shoulders especially on rural roads; shared streets; slow speed shared streets; residential skinny streets; installation of sidewalks; using paint to create walking paths where sidewalks are impractical; enhanced cross walks; shared lane markings; buffered bike lanes; roundabouts; and in many cases, the addition of more greenery.
- Complete streets mean:
 - High level policy that directs transportation planners and engineers to routinely design and operate the entire right of way to enable safe access for all users;
 - Changes in everyday decision making and operations;
 - Incremental approach that changes the streetscape one small project at a time;
 - Long term results that benefit the entire community.
- Complete streets does not mean:
 - One ‘special’ street project;
 - A design prescription;
 - A mandate for immediate retrofit;
 - A silver bullet; other issues must be addressed such as land use, environmental concerns and transportation demand management.
- There are five key steps to moving from policy to practice:
 - Organizing implementation activities;
 - Restructuring procedures, policies, and programs;
 - Rewriting or updating design guidance;
 - Offering training opportunities to transportation staff, community leaders, and the general public;
 - Creating new performance measures.
- The larger picture, however, to result in more people taking more trips by foot or bike requires attention to “Four E’s” (education, encouragement, enforcement, and engineering).

Monday, November 10

Meeting with Brian Melairei, Director of Public Works and CIP Office

Participants

- Brian Melairei, Director of CIP and Acting Director of Public Works
- Michael Moule
- Valerie Whipps
- Judy Otto
- Kambes Kesolei

Presentations and Discussions

This was an introductory meeting. UAK/CTFP introduced Michael who briefly summarized his own professional background and provided an overview of “complete streets” using the evolution of the concept in Kauai as a point of reference.

Brian noted that he has recently received queries from the Belau Tourism Association asking for copies of pedestrian regulations which do not exist at present in Palau. He noted that the Bureau of Public Works uses best management practices in designing and maintaining roadways and walkways but is constrained due to land availability and finance. The Bureau is supportive of the intent of complete streets but believes this is a social and environmental issue best led by EQPB.

Brian noted that there is Japan Grant Assistance to upgrade the Koror water system. This will entail extensive construction running from the Ngermid intersection to the PVA intersection. At the conclusion of the project, the roadway will be resurfaced. This provides opportunities for enhancing the walking and biking environment. Detailed design work will begin in April 2015 and walk/bike advocates should be prepared to participate in these discussions.

While Brian personally cannot participate in the complete streets workshops, he will designate the Senior Project Engineer from CIP to participate.

Key Points

- EQPB is an important player in complete streets.
- The upcoming Japan-funded water line project will provide an opportunity to enhance the walking and biking environment in central Koror from Ngermid to the PVA intersection.
- Improvement of the pedestrian and biking environment is severely constrained by land access issues and finances.

Meeting with Jon Vogt and Michael Chapman about Koror-Airai Sewer Project

Participants

- Jon Vogt (Melekau Environmental Consulting)
- Michael Chapman (Team leader and project manager, Koror-Airai Sanitation Project – Asian Development Bank contractor)
- Judy Otto
- Valerie Whipps
- Kambes Kesolei
- Michael Moule

Presentations and Discussions

This was another introductory meeting in which Michael briefly provided background on complete streets before moving the discussion to the upcoming sewer project. The Melekau team showed maps of their project area which runs from Iybukel (Island Mart area) to Malakal (site of CIP Office). Work will be taking place on the west side of the national road while work on the water project takes place on the east side. The timeline for the water and sewer projects is somewhat different. Since the sewer project requires more extensive earthmoving, construction will not start until at least late 2015. Both projects provide an opportunity for enhancing the walking and biking environment along the national road but coordination between the two is essential.

Key Points

- Both the water and sewer projects provide opportunities for enhancing the walking and biking environment along the national road in Koror.
- Coordination between the two projects is essential, especially since road re-surfacing is tied to the water project which is likely to be completed before the sewer project.

Meeting with Koror State Officials

Participants

- Eyos Rudimch, Speaker of the Koror State Legislature and members of the legislature
- Representatives from the Office of the Governor
- Representatives from the Koror State Planning and Zoning Commission
- Representatives from the Koror State Public Lands Authority)
- CTFP and UAK partners

Presentations and Discussions

This was a lunch meeting held at the Koror State Assembly Hall. Following introductory remarks by Kambes Kesolei on behalf of CTFP and UAK, Michael Moule led off with a formal PowerPoint presentation “Introduction to Complete Streets.” Koror State officials were highly receptive to the concept of complete streets. A spirited discussion followed the presentation about specific issues and solutions that might be applied to these issues. The importance of complete streets as a strategy to reduce traffic congestion and demand for new or wider roadways was underscored. Without using the phrase “complete streets,” Koror State has enacted legislation to enhance the walking environment by mandating that sidewalks be constructed on most streets. Many Koror streets, however, are narrow and have limited right-of-way. State officials were pleased to learn that there are options for enhancing the walking environment in places where sidewalks are not feasible. It was noted that design and funding for most street projects flows through the national government. It is therefore important that both levels of government adopt complete streets policies and work in close partnership to enhance walkability as new roadwork is being planned.

Key Points

- Koror State officials were highly receptive to the concept of “complete streets” and pleased to learn that there are options for enhancing the walking environment in places where sidewalks are not practical.
- Implementing a complete streets policy will require close collaboration between the state and national governments.

Meeting at GB Harris Elementary School

Participants

- Principal, Wicliff Emul
- Teachers
- Parents
- CTFP and UAK partners

Presentations and Discussions

The group met initially in the summer house in front of the school where congestion at the end of the school day was readily apparent. From there, Michael led the group on a walk audit in the immediate catchment area of the school (Ngerchemai and Iyebukel Hamlets). The group then returned to the school for a discussion of issues and options (see details presented in the walk audit section of this report).

Key Points

- Make the street in front of school one way at least during peak student arrival and dismissal hours.
- Use Iyebukel street as a pilot site for removing center line of roadway and incorporating marked (painted) pedestrian path on the sides (see walk audit and recommendations sections of the report).

Meeting with Omekesang (Organization of Persons with Disabilities)

Participants

- President and members of Omekesang
- UAK and CTFP partners

Presentations and Discussions

This session began at the Omekesang Office (Ngerbeched) with a very brief meeting to introduce Michael to the members. Participants then moved to the street for a walk audit (see walk audit section of the report) and returned to the office for discussion. The extreme difficulty encountered by persons with disabilities trying to navigate Palau's streets was readily apparent during the walk audit. During the meeting that followed Omekesang members indicated they very seldom try to move around independently due to the many constraints. They emphasized that under the International Convention on the Rights of Persons with Disabilities, it is their right to be able to move freely in their community. They noted that even when efforts are made to accommodate people with disabilities, these are not always successful due to lack of guidelines and standards. For example "disabled parking spots" are mandated by law but there no design standards have been adopted. Most "disabled parking spots" are nothing more than ordinary parking spots with a sign; these need to be widened to accommodate wheelchairs. Ramps are not required by law but some establishments have constructed ramps; unfortunately many ramps are too steep to be safely navigated by a person using a wheelchair. The problem is not necessarily unwillingness on the part of the community to safeguard the rights of persons with disabilities but lack of awareness and lack of locally adopted design standards.

Key Points and Recommendations

- Walk audits are very useful for highlighting constraints faced by persons with disabilities. Walk audits should be repeated with key decision makers such as the Minister of Community and Cultural and Affairs and the Director of Public Works so that these people can witness first-hand the challenges faced daily by citizens with disabilities.
- Legislation is needed to realize locally the rights guaranteed under the International Convention on the Rights of Persons with Disabilities; these rights include access to public places.
- Design standards are needed to ensure that measures taken to enhance mobility actually achieve their intended purpose.

Tuesday, November 11

Business and Tourism Focus Group

Participants

- Belau Tourism Association
- Palau Visitor's Authority
- CTFP and UAK partners

Presentations and Discussions

This lunch meeting held at the Penthouse Hotel was organized by Ray Sakuma, Executive Director of Belau Tourism Association. Following opening remarks by Ray (BTA) and Kambes Kesolei (CTFP and UAK), PVA Managing Director Nanae Singeo made a brief presentation highlighting (1) work of Dr. Akiko Iida of Tokyo University, School of Engineering who has done some preliminary designs to illustrate how much more attractive and “walkable” Koror could be with enhanced landscaping; and (2) results of PVA exit interviews that show that the walking environment and signage are concerns of visitors to Palau. Samples of Dr. Iida’s images are presented at right.

- Image 1 showing downtown Koror during Japanese times where the streetscape was specifically designed to support walking and biking;
- Image 2 showing downtown Koror today with a streetscape virtually devoid of greenery and filled with cars but few people; and
- Image 3 showing how the downtown streetscape would be enhanced by simple addition of greenery and sidewalks.



Following the PVA presentation, Michael presented his introduction to complete streets presentation which integrated some images and concepts from Day One walk audits and meetings. In the discussion that followed, participants clearly voiced their support for a more walkable community, especially in downtown Koror. Although all participants agreed that Koror needs better sidewalks, other specific concerns voiced had to do with crosswalks and behavior of tourists and tour guides.

Key Points and Recommendations

- **Crosswalks:** It was widely agreed that Koror's crosswalks are "an accident waiting to happen." Michael suggested (1) rectangular rapid flashing LED beacons (RRFBs) be installed on selected cross walks; (2) stop lines and signs for crosswalks be moved back to at approximately 30 feet from the crosswalk; (3) paint or cone off the median before and after crosswalks to prevent crashes due to conflicts between pedestrians and multiple lanes of traffic; this is a problem at all times but especially problematic at night.
- **Pedestrian behavior:** The group noted that pedestrians and tour guides bear some responsibility for safety. It was recommended that pedestrian safety (especially use of crosswalks) be a part of Koror State's mandatory tour guide training as it was noted that in some cases tour guides are encouraging and even leading tourists across the road outside of marked crosswalks. It was also suggested that PVA include a page on pedestrian tips in their publications for visitors and/or a one page printout in multiple languages that could be distributed by tour guides or at hotels.
- **Bus parking:** It was noted that pick-up and drop-off of visitors by tour buses was not well planned. One suggestion was that the post office parking area is "dead space" after 4:30 so that this area could be used as a safe place for pickup and drop-off by tour buses.

Wednesday, November 12

Planning and Infrastructure Sectors

Participants

- Ben Asuncion, Senior Project Manager, of the National CIP Office
- Michael Moule
- Judy Otto, UAK and CTFP

Presentations and Discussions

Because many of the key people invited to this session were attending a conference in Manila, this time was used as an opportunity to hold in-depth discussions with Mr. Asuncion. Michael and Ben reviewed the "introduction to complete streets" presentation with the focus of discussion being how these principles could be adapted to address practical health, safety, and aesthetic concerns of today. Visits were then made to roadways in Malakal, Meyuns, Ikela, and central Koror. For a summary of key points and recommendations, please see the walk audit section of the report.

Health, Safety, and Recreation Sectors

Participants

- Minister of Health Gregorio Ngirmang
- MOE staff Jubilee Kuartei
- Eden Uchel, Chief, Environmental Health
- Annabel Lyman and Valerie Whipps, CTFP
- Edolm Ikerdeu, NCD Coordinator
- Frida Delmau, Executive Director, Palau Housing/Palau Woman and Sports Commission/PNOC
- Carol Ngiraidis, Chamber of Commerce/Belau Tourism/Palau Women and Sports
- Tino Faatuuala, nutritionist;
- Government Tourism Office
- Dorothy Ueda representing women leaders

Presentations and Discussions

After a brief introduction and welcome by CTFP, Michael delivered an in-depth presentation on complete streets. This group of health and recreation advocates was fully on-board with the health and environmental rationale for enhancing walkability and bike-ability. Edolm noted that the recent STEPS survey found that 54% of adults do no walking or biking in an average week. Discussion focused around the need for a comprehensive approach to complete streets involving the 4 “E’s”:

- Education
- Encouragement
- Enforcement
- Engineering

Key Points

- Restructure policy, procedures, and programs in support of walking and biking
- Create/rewrite/update design guidelines
- Offer training opportunities to transportation staff, community leaders and general public
- Create new performance measures that reward use of walkable/bikeable designs

Environment and Climate Change Sector

Participants

- Charlene Mersai, National Environmental Planner, Office of Environmental Response and Coordination (OERC)
- Erbai Matsutaro, Urban Planner and Climate Change focal point, OERC
- Tarita Holm, Office of Environmental Response and Coordination, OERC
- Tiare Holm, Ngardmau State
- Ann Kitalong, The Environment, Inc
- Maireng Sengebau, BEHST (Palau)
- Madelsar Ngiraignas, formerly PACC Coordinator, Palau Community College
- Michael Moule
- Judy Otto
- Valerie Whipps and Annabel Lyman (CTFP)

Presentations and Discussions

Participants were welcomed by CTFP. Michael provided an overview of complete streets. The discussion that followed highlighted the linkage between complete streets and the environment with special focus on enhancing resilience and reducing Palau's carbon footprint.

Key Points

- Key points and recommendations were similar to those summarized for the Health, Safety, and Recreation sectors (see section above).

Thursday, November 13

Palau Complete Streets Design Summit

Michael Moule facilitated a full day design summit about Complete Streets, with the following objectives:

- Learn tools for making our streets safer and more inviting for walkers and bikers
- Create a vision of "Complete Streets Shared by All"
- Identify policy options to move us toward our vision
- Identify specific projects we can implement now (one-to-two years) to make a difference
- Identify next steps and who will lead

Complete Streets Design Summit Agenda

- Opening and welcome by UAK and CTFP
- Keynote Address by Tutii "Joe" Chilton: Healthy communities by design
- Presentation by Michael Moule: Introduction to complete streets
- Group work session: How can Palau benefit from complete streets?
- Presentation by Michael Moule: Implementing complete streets
- Working Lunch: Create a shared vision across sectors
- Presentation by Michael Moule: Performance measures
- Group work session: What outcomes are important to Palau?
- Presentation by Michael Moule: Effective complete streets policies and procedures
- Group work session: Complete Streets Policy:
 - What existing activities, policies, and procedures promote complete streets in Palau?
 - What should be included in a complete streets policy for Palau?
 - Start crafting a complete streets policy.

Results from Design Summit Work Sessions

The design summit included several work sessions, where the participants brainstormed answers to several questions related to complete streets. The results of these work sessions are as follows.

How can Palau benefit from complete streets?

1. Health
2. Safety
3. Saving money
4. Boosting the economy
5. More attractive for tourists
6. Happy people

Report on a Week-Long Focus on Complete Streets in Palau
Coalition for a Tobacco Free Palau and Ulkerreuil A Klengar

7. Vehicle demand reduction
8. Social interaction
9. Improved air quality, Reduced pollution
10. Reducing carbon footprint
11. More accessible for other types of commuters/travelers
12. Better roads
13. Reduce traffic congestion
14. Require developers to construct sidewalks on their street frontage, and in some cases also require off-site improvements to provide sidewalk access to the developments.
15. Policy about clearing bushes at intersections and crosswalks.

Complete streets performance measures: What outcomes are important to Palau?

1. Number of walkers and bikers
2. Changes to motor vehicle volume (especially peak hour)
3. Increased public transportation
4. Number of crashes (by area to identify high-risk locations).
5. Number of projects that include complete streets improvements.
6. Number of miles or kilometers of sidewalks and bike lanes.
7. Modify PVA Exit Survey to include questions about the walking environment, and how tourists travel (e.g. rental car, tour bus, walking) – list top X number.
8. Number of students walking or biking to/from school (school health screening)
9. Household expenses on transportation
10. Consider a transportation survey for residents
11. Improve STEP survey for walking and biking data.
12. Reduced obesity rates
13. Create national walk to school day; count kids walking that day.
14. Independence for those disabled
15. Survey sidewalks and roadways for accessibility compliance
16. Survey of disabled and vulnerable population and their transportation modes
17. Look at policies that are developed and how they are enforced.
18. Tourists in the downtown area.
19. Count people using crosswalks or not using crosswalks

What existing activities, policies, and procedures promote complete streets in Palau?

1. Sidewalks have been built along some streets (e.g. when main road in Koror was reconstructed).
2. Compact road shoulder is deteriorating, but for new roads, the shoulder is being built to the same pavement standard as the travel lanes
3. Koror State government is working to improve the drainage systems in neighborhoods.
4. The new main causeways in Koror have walkways.
5. Koror State has implemented a licensing system for dogs; unlicensed dogs are picked up – makes streets more friendly for walking.
6. Promotion of walking (share the road, KAD)
7. Koror State requires accesses to main highway to be paved.
8. Crosswalks on main road in Koror
9. Most of the communities in Babeldaob have good walkways within the villages.
10. Public safety is trying to manage the flow of traffic.

What should be included in a complete streets policy for Palau?

1. Includes an overall vision statement

2. Need to have a dedicated government agency that deals with roads, separate from other infrastructure issues; would approve exceptions.
3. In the process of setting up a coordinating body for NCDs (non-communicable diseases); the complete streets policy should be involved with the development and/or reviewed by this coordinating body.
4. Future projects should make provisions for all modes of transport (walking, bicycling, motorists, freight, and future transit).
5. References complete streets guidelines (establish or adopt guidelines), with reference to different designs for different contexts.
6. Inventory our existing situation; identify significant problem areas or gaps (e.g. lack of a walkway between the two causeways between Koror and Malakal).
7. Policy addresses planning, design, construction, and maintenance
8. Potentially includes ban or regulation of electronic or distracting billboards.
9. Future subdivisions have multiple connecting roads and/or sidewalks.
10. Includes trees and green elements.
11. Includes requirements for complete streets features during development review process
12. Includes performance measures (see other list)
13. Creates overarching National policy that addresses all agencies and all roads
14. Includes Implementation steps

At the end of the design summit, two work groups prepared two versions of an Executive Order in support of complete streets designs and policy; and started to reconcile the two versions.

Friday, November 14

Leadership Breakfast

The Leadership Breakfast was held at the Koror State Assembly Hall. Its purpose was to summarize the results of the week for the benefit of elected and traditional leaders while eliciting their views on the concept.

Participants

Participants included representatives from the Council of Chiefs, Olbiil Era Kelulau (national congress) and women leaders.

Presentations and Discussions

Following welcoming remarks by Kambes Kesolei, Michael introduced complete streets with a PowerPoint presentation that had been significantly localized over the course of the week. Special attention was given to specific recommendations for problems voiced by participants (see recommendations section of this report). In discussions following the presentation, the leadership voiced strong support for complete streets noting the many health, safety, environmental, and economic benefits of enhancing the walkability of Palau's streetscapes.

Meeting with the First Lady

This was a lunchtime meeting with First Lady Debbie Remengesau in her capacity as national focal point for beautification. Also present were her advisor, Dorothy Ueda and the UAK-CTFP team (Michael, Kambes, Judy, and Valerie).

Report on a Week-Long Focus on Complete Streets in Palau
Coalition for a Tobacco Free Palau and Ulkerreuil A Klengar

Using his laptop instead of a formal presentation, Michael introduced the concept of complete streets to the First Lady. The role of aesthetics in promoting walking was discussed. Research clearly supports a strong link between complete streets and the First Lady's mandate for beautification. Some of the constraints the First Lady has encountered with respect to land tenure and relations between national and state governments were noted.

Discussion centered on the feasibility of creating a pilot "green zone" in downtown Koror possibly using the existing (old) walkway running from the Ministry of Education to the Post Office that would combine beautification and walkability objectives. A formal proposal would need to be prepared with input from national and state governments as well as representatives of the public.

CTFP and UAK Policy Work Session

Participants

- Erbai Matsutaro, Urban Planner and Climate Change focal point for OERC
- Valerie Whipps, Kambes Kesolei, and Annabel Lyman, CTFP
- Judy Otto and Lorraine Rivera, UAK
- Debbie Toribiong, Kotel A Deurreng
- Michael Moule

Outputs

- Key recommendations for actions were formulated as presented in the appropriate section of this report.
- The draft policy statement on complete streets from the symposium was honed with the view of finalizing this for submission to the Office of the President for his action.

RECOMMENDATIONS

The following complete streets recommendations for Palau include policy recommendations as well as specific infrastructure recommendations.

POLICY RECOMMENDATIONS

These recommendations include policy and procedural recommendations to implement complete streets on Palau. Some of these recommendations might be adopted in the form of laws of the National government or state governments. Other recommendations would be appropriate to adopt at the agency or departmental level, including planning and zoning agencies as well as public works or construction agencies.

Overarching Complete Streets Policy

One important step is to adopt overarching complete streets policies to require that all activity (e.g. planning, design, construction, and operation) related to streets and highways adhere to complete streets principles. During the Complete Streets Design Summit on November 13, and during a follow up work session on November 14, participants developed a draft complete streets policy. It is recommended that this policy be finalized and adopted by the National Government, either via a Presidential Executive Order or by action of the Palau National Congress.

Additionally, it would be useful to pass similar policies within the state governments, especially Koror State since it has a significant network of roads and streets under its control.

Sidewalk Requirement for Developers

Most cities and counties in the United States have planning and zoning ordinances that require developers to install sidewalks during development. It is recommended that a similar policy be adopted in Palau. This would likely be adopted at the state level, and is most important for the state of Koror, but could be applicable to other states where future development is likely. In particular it is especially important to require sidewalks during the development of new hotels. Hotels are large generators of pedestrian activity, including tourists as well as employees at the hotel. Requiring sidewalks on the street frontage of hotels and other developments is the most important policy recommendation, as this gradually builds a network of sidewalks; policies requiring sidewalks along development street frontage are extremely common in the United States. For large-scale developments, requirements for improving the transportation system can be much broader. Many US jurisdictions have “conditional use permits” or other permit requirements for major developments that allow the approving agency or commission to require various improvements as a condition of development approval. Conditions of approval often include “off-site” road improvements to provide better access for people traveling by all modes, such as sidewalks, bicycle facilities, and improved roads near the development, not merely directly adjacent to it. As described on page 5 of this report, the road to Malakal Quarry may be a good location to require a future hotel developer to construct sidewalks as a condition of the development.



Secondary Road in Malakal, if sidewalk were to be built by the nearby hotel developer

Lane Width

One of the challenges for implementing Complete Streets in Palau is availability of road and street right-of-way, outside of adjacent private properties. Using narrower lane widths is one way to maximize the availability of areas for sidewalks, bicycle lanes, and other elements of complete streets. While it is often assumed that the “standard” lane width is 3.6 meters (12 feet), there is a significant body of research in the United States that shows that lane widths between 3.0 meters and 3.6 meters (10 feet and 12 feet) have similar safety records for high-volume streets with travel speeds lower than 70 km/hr (45 mph).¹ Minor streets can have lane widths as narrow as 2.7 meters (9 feet). It is recommended that the national and state government adopt the following lane width standards:

- 3.3 meters (11 feet) for major roads in rural areas
- 3.0 meters (10 feet) for major roads in urban areas and villages.
- 2.7 to 3.0 meters (9 feet to 10 feet) for secondary roads.

Policy for Clearing Vegetation near Intersections and Crosswalks

Crosswalk and intersection safety is highly dependent on the provision of adequate sight distance between road users. At some locations, the presence of vegetation can significantly reduce the sight lines between users. It is recommended that the road agencies (both National and state) adopt internal policies to maintain vegetation near crosswalks and intersections. It is even possible to require private property owners to maintain vegetation in the name of safety.

¹ Potts, Ingrid B., Douglas W. Harwood, and Karen R. Richard. "Relationship of lane width to safety on urban and suburban arterials." *Transportation Research Record: Journal of the Transportation Research Board* 2023.1 (2007): 63-82.

Parking Enforcement on Sidewalks

There are several locations on the main road in Koror where motorists regularly park on sidewalks. At some locations (e.g. near the center of Koror) businesses have created marked diagonal parking spaces in a manner that encourages drivers to park with the back of their vehicle blocking the sidewalk formed by the covered ditch. At other locations, motorists simply park their vehicles on the existing sidewalks that are set back from the roadway. It is recommended that Public Safety and other departments work to increase enforcement of parking on sidewalks and deter business owners from marking spaces that encourage parking on sidewalks.

SHORT TERM INFRASTRUCTURE RECOMMENDATIONS

The following recommendations can be implemented in a short time frame (within about 1 year).

Pilot Projects for Secondary Roads

Many of the recently reconstructed secondary roads in Koror have a width of 5.4 to 6.0 meters (18 to 20 feet), with no pedestrian facilities. Some examples include the road to Ngerbeched Hamlet and the road to G.B. Harris Elementary School within Iyebukel Hamlet. There are yellow raised reflective pavement markings used to mark the centerlines of these roads. It is recommended that the centerline markings be removed on these roads, in order to encourage motorists to share the road with pedestrians and bicyclists more readily, and overtake with more space. The United States Manual on Uniform Traffic Control Devices (MUTCD) is used by public works agencies in Palau to provide guidance for the installation of signs and markings. The MUTCD does not require centerlines on any urban road or street with less than 6,000 vehicles per day (2009 MUTCD, Section 3B.01); most secondary roads in Palau do not carry that much traffic.

It is recommended that another treatment be tested on a secondary road in Koror, as a pilot project. In addition to removing the centerline, it is recommended to add “advisory” pedestrian lanes, as described below. The recommended pilot location is the road that connects from Island Mart into Iyebukel Hamlet, leading toward G. B. Harris Elementary School.

There are two recommended possible options. The first option is to take the existing 5.4 meter (18 feet) wide roadway and to use broken white lines to mark a 3.0 meter (10 feet) wide lane in the center of the road, leaving two 1.2 meter (4 feet) wide “advisory pedestrian lanes” on both sides. Motorists would be encouraged to drive in the center of the road. When two vehicles approach each other in opposite directions, both vehicles would move into the advisory pedestrian lanes in order to maneuver past each other. A similar design with advisory bicycle lanes has been widely used in several European countries including Switzerland and the Netherlands, as well as several cities in the United States. As an alternative, a 3.0 meter (10-feet) wide lane could be installed on one side of the roadway, leaving a 2.4 meter (8 feet) wide advisory pedestrian lane on one side of the road. This alternative design would tend to give priority to vehicles for which the vehicle lane is on the right side of the roadway. Vehicles traveling in the direction for which the vehicle lane is on the left side would need to pull into the advisory pedestrian lane in order to let opposing vehicles pass.

Report on a Week-Long Focus on Complete Streets in Palau
Coalition for a Tobacco Free Palau and Ulkerreuil A Klengar



Existing Koror Secondary Road in Iyebukel near Island Mart



Proposed Koror Secondary Road Option 1 (Advisory Pedestrian Lanes on Both Sides)



Proposed Koror Secondary Road Option 2 (Advisory Pedestrian Lane on One Side)

Report on a Week-Long Focus on Complete Streets in Palau
Coalition for a Tobacco Free Palau and Ulkerreuil A Klengar

One possible addition to this pilot project in Iyebukel is to make the roadway in front of G. B. Harris Elementary School one way westbound during school arrival and dismissal times (approximately 7:30 AM to 8:30 AM and 2:00 PM to 3:00 PM on school days).

Another possible pilot project is on the secondary road that leads to the Koror State offices and Koror Elementary School, past the baseball field. This road is currently 8.2 (27 feet) meters wide. This road could be restriped to have two 3.0 meter (10 feet) wide travel lanes and a 2.2 meter (7 feet) wide pedestrian lane on one side.



Existing Road to Koror Elementary School



Proposed Road to Koror Elementary School, with Pedestrian Lane on one Side

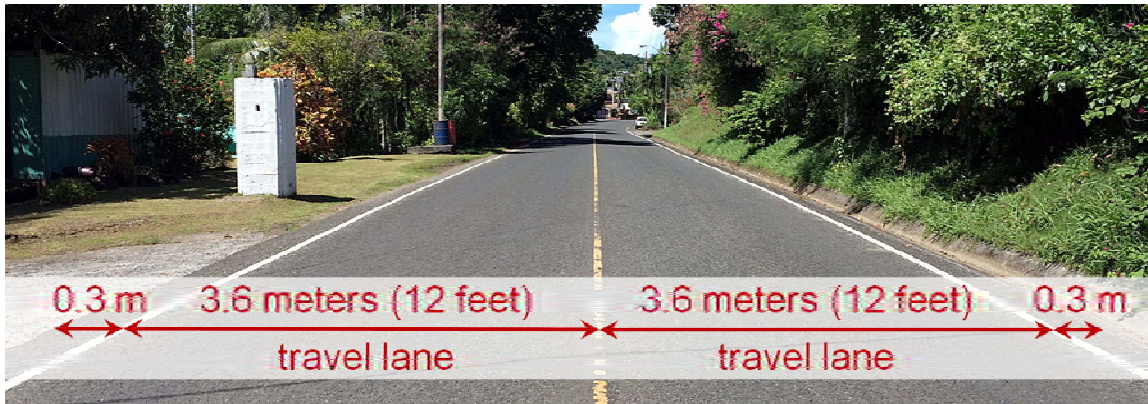
These pilot projects would be implemented by Koror State Public Works and Koror State Planning and Zoning departments.

Pilot Project on National Road in Meyuns (to PPR)

This road is currently 8 meters (26 feet) wide, but with 3.6 meter (12 feet) wide travel lanes. It is recommended that this roadway be restriped with two 3.0 meter travel lanes and two 1.0 meter shoulders. Making this small change will encourage motorists to travel more slowly, and significantly improve the comfort of people walking and bicycling along this road.

Report on a Week-Long Focus on Complete Streets in Palau
Coalition for a Tobacco Free Palau and Ulkerreuil A Klengar

This project would be implemented by the national Public Works office.



Main Road in Meyuns Existing Condition



Main Road in Meyuns – Proposed Re-stripe

Raise Gas Tax

It is recommended that the National or State governments raise the current gas tax, with two purposes. First, additional gas tax could provide dedicated funding for transportation projects; which would make the implementation of complete streets principles more possible. Oil prices have dropped dramatically in recent months, so this a good time to raise gas taxes. The second purpose for raising fuel prices is to reduce the demand for driving, although the current low oil prices reduce this disincentive.

Operational Changes to the Main Road in Koror

The main road has permanent markings with one lane in each direction and a center turn lane. On work days, cones are used to convert the center turn lane into a through lane in the peak flow direction, in order to increase the capacity of the road. By observation during the week-long visit, it appears that the cones are placed to provide two lanes toward Meyuns and Malakal from about 7 AM to about 11 AM, at which time the cones are moved in order to provide two lanes towards Airai.

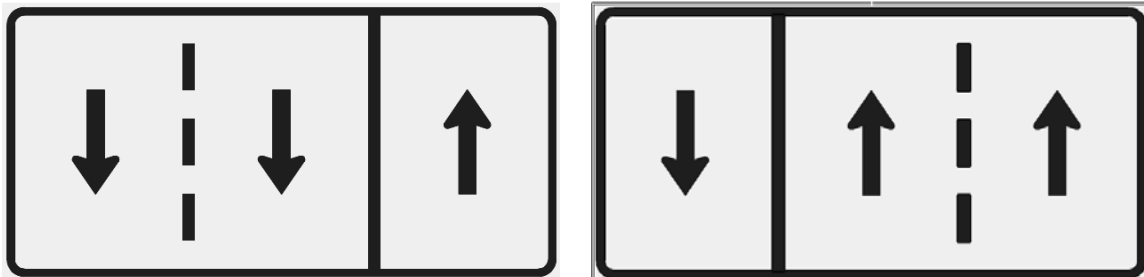
Observations indicated that the center lane was underutilized for through traffic during much of the day. During those times, the center lane was used for three primary purposes:

1. Left turn movements in the peak direction.
2. Through movements in the peak direction, typically done at significantly higher speeds than that of traffic in the adjacent lane. This high-speed movement was often interrupted by drivers making left turns, sometimes resulting in potential conflicts.
3. Left turn movements in the off-peak direction. There are relatively few cones being used to identify the reversible lane, so vehicles in the off-peak direction occasionally pull into the center lane to turn, creating a significant conflict with the high-speed through movements in the other direction.

It is recommended that the center turn lane operations be changed to reduce the amount of time during which the center lane is used for through traffic. The overuse of the center lane for through traffic is likely counterproductive to both safety and efficiency. In addition it is recommended that the signs and markings be improved. The following changes to the reversible lanes are recommended:

1. For a relatively short period in the morning (approximately from 7 AM to 9:00 AM), the center lane should be used for travel toward Meyuns/Malakal.
2. For a short period in the afternoon (approximately from 3:30 PM to 6 PM), the center lane should be used for travel toward Airai.
3. The center lane should be used as a two-way center turn lane during all other hours.
4. Additional cones should be used to delineate the division between the directions of travel. Currently, the cones are spaced at one hundred meters or more. It is recommended that cones be spaced at approximately 30 to 40 meters.
5. Use signs to indicate the lane assignment when the center lane is used for through traffic. Signs like those shown in the image below should be placed periodically along the sides of the main road when two lanes are being used in the same direction.
6. When the center lane is used exclusively for left turns, it is recommended that some of the cones be used to delineate flush median areas at midblock (or T intersection) crosswalks.

These changes will need to be implemented by Public Safety. PWASC (Palau Women and Sports Commission) and CTFP have indicated that they can work with Public Safety on these changes.





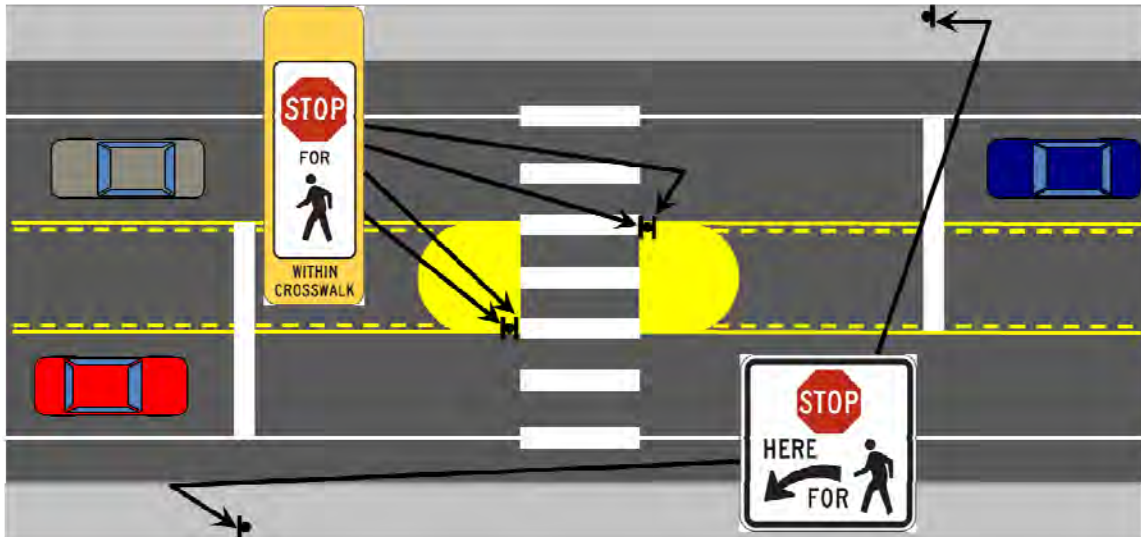
Example of “contra-flow” cones and signs from Kauai, Hawaii, United States. These images show cones spaced at about 35 meters and a small post-mounted signs. The signs indicate two lanes in one direction, with a “keep right” message facing the other direction where there is only one lane.

Short-Term Crosswalk Enhancements on the Main Road in Koror

The following changes are recommended to the crosswalks on the main road in Koror (some of these changes can only be implemented at some of the locations, due to proximity of intersections, driveways, and on-street parking):

1. Move advanced stop lines further back (30 feet from crosswalk).
2. Add “Stop Here For Pedestrians” (R1-5b) signs on the side of the road at the crosswalks. At some locations, there may not be room for these signs.
3. Add in-street “Stop For Pedestrians In Crosswalks” (R1-6a) signs between the lanes at the crosswalks. These signs are 0.3 meter (1 foot) wide, and can be placed on the street in a permanent or temporary manner. These signs have two purposes, reminding drivers to stop for pedestrians, and narrowing lanes to encourage slower vehicle speeds.
4. At locations where there is no need for left turns into a street (e.g. midblock crosswalks or at T intersections), mark the center lane with solid yellow paint as a flush median. This treatment can be enhanced by using cones to delineate the painted flush medians when through movements are not allowed in the center lane. These cones could be the same cones that are used to delineate the peak hour usage of the center lane.

These enhancements would need to be implemented by the National Public Works office, with cooperation and assistance from Public Safety; see below for an image illustrating these changes.



Proposed signing and marking changes for mid-block crosswalk on the main road in Koror

Restriping of Main Road in Koror after Repaving

There are currently design efforts going on for both a water line project and a sewer line project along the main road in Koror. Based on conversations with National Public Works office staff, the water line project will end up tearing up a lot of the existing roadway, due to the need for the new water line to run under the existing paved surface, and the installation of many water laterals crossing the road. After the water line project is complete, it is anticipated that the entire road will be resurfaced. This resurfacing project is an excellent opportunity to provide a “clean slate” for restriping the road differently after the project. The following markings changes are recommended after repaving:

1. Mark three lanes 3.0 meters (10 feet) wide, with shoulders 0.9 meters (3 feet) wide shoulders on both sides of the road, improving the comfort of pedestrians using the narrow sidewalks.
2. Incorporate all recommendations for crosswalk markings above (if not done earlier).
3. Mark the crosswalk markings so the lines avoid the wheel paths of vehicles as shown in the image above of proposed crosswalk markings.

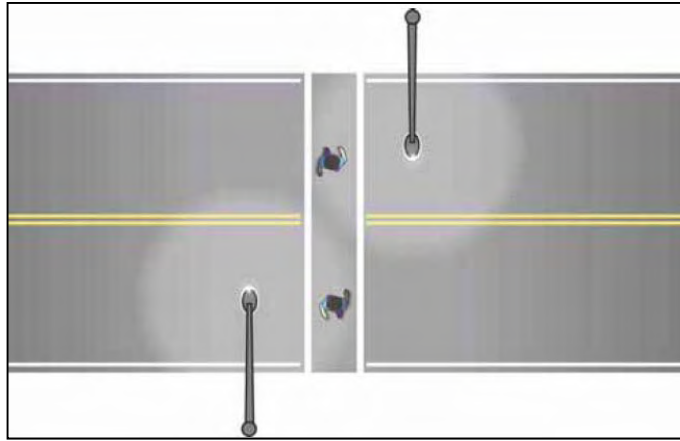
LONG TERM INFRASTRUCTURE RECOMMENDATIONS

Long-Term Crosswalk Enhancements on the Main Road in Koror

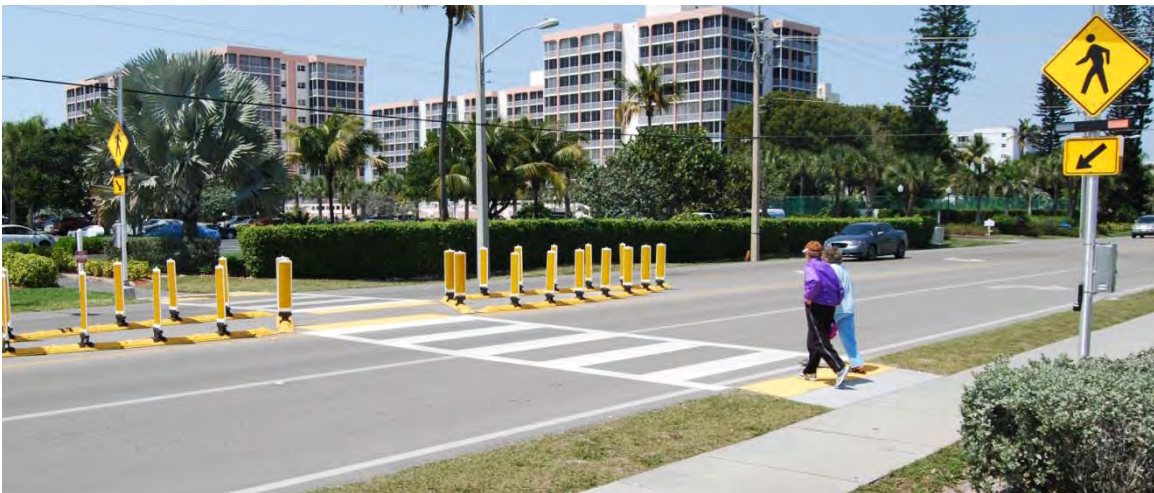
In addition to the short term changes recommended above for crosswalks on the main road in Koror, there are some recommendations that require additional funds or significant construction. These long-term recommendations are as follows:

1. Add illumination (street lights) at each crosswalk location. Lights should be placed over the road, in advance of the crosswalk, as shown in the image at right.
2. Provide rectangular rapid flashing beacons (RRFBs) on pedestrian warning (W11-2) signs, facing both directions at each end of the crosswalks. Information about using RRFBs can be found at the US Federal Highway Administration website:

http://mutcd.fhwa.dot.gov/resources/interim_approval/iau/fhwamemo.htm.



Example of proper illumination for crosswalks



Rectangular Rapid Flashing Beacons (RRFB) placed on pedestrian crossing signs at a crosswalk

These changes require significant expense, which means that the crosswalks should be prioritized so that the most used crosswalks receive these treatments first.

Proposed Cross Sections for Secondary Roads in Koror

It is recommended that the state of Koror continue to reconstruct the surface of secondary roads in Koror, but in the future it is critical to incorporate complete streets elements. There are two recommended cross sections for these secondary roads

Street Reconstruction Using Existing Drainage

The simplest way to reconstruct these streets is to build a cross section that allows storm water to run off the roadway similar to how it does today, either into an existing ditch or as sheet flow onto the side of the road. This cross section is similar to what has been built on the streets leading to Ngerbeched Hamlet and the road to G.B. Harris Elementary School within Iyebukel Hamlet, but with a separated sidewalk along the street. The recommended design is similar to the designs seen in Ngardmau and Melekeok, where the road structure is all concrete, with a raised curb (with openings) separating the vehicle lanes from the pedestrian sidewalk.



Recommended Koror Secondary Road Reconstruction Using Existing Drainage

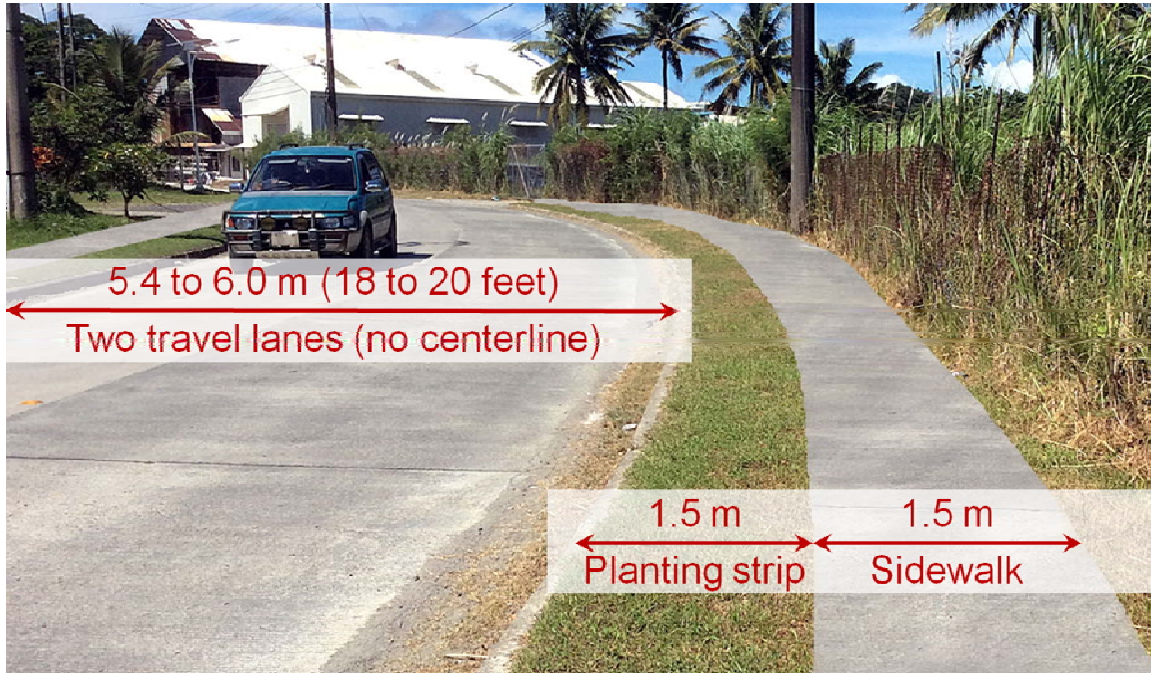
The recommended dimensions for this design are a 1.4 meter to 1.6 meter sidewalk (measured from edge of pavement to the curb face on the motor vehicle side of the curb), with a 5.4 meter to 6.0 meter wide roadway. This requires a total width of 6.8 meters or 7.6 meters. In total, this is more width than the 5.4 to 6.0 meters that has recently been constructed on secondary roads in Koror, but it should be possible to squeeze in another meter or two during reconstruction of most existing roads.

Street Reconstruction Using Curb and Gutter

The other recommended option is to use a street cross section similar to the street visited in Malakal, but with sidewalks constructed outside of the curbs. This option takes up more space, and would only be possible where there is more available right-of-way. But on the other hand, this option provides a much better solution for drainage, eliminating the open ditches that exist along many streets. It is a more expensive option, because drainage infrastructure such as underground pipes and curb inlets or grates would be necessary.

Report on a Week-Long Focus on Complete Streets in Palau
Coalition for a Tobacco Free Palau and Ulkerreuil A Klengar

The recommended dimensions for this design are a curb-to-curb width of 6.0 to 7.0 meters (20 to 23 feet), with gutters about 0.5 meters (1.5 feet) wide. Sidewalks are recommended to be 1.5 meters (5 feet) wide, preferably with a separation (grass or other plantings) that is 1.0 to 1.5 meters (3 to 5 feet) wide. Ideally, sidewalks would be built on both sides of these streets, although in constrained areas a sidewalk on one side is much better than none.



Recommended Koror Secondary Road Reconstruction Using Curb and Gutter

Lebuu Street and Road in Front of the Penthouse Hotel

As discussed at the Design Summit, there may be some merit to making Lebuu Street and the road in front of the Penthouse Hotel one way streets. This would allow permanent pedestrian lanes or paths to be marked on these streets. However, this proposal would need to be evaluated carefully, due to the fact that creating one-way streets results in out-of-direction travel for motorists. In addition, this conversion would relocate existing turning movements onto and off of the main road; these turning movements should also be evaluated carefully. The most probable scenario is to make Lebuu Street one-way westbound, and the road at Penthouse Hotel one-way eastbound, as this would allow the streets to better serve as bypass routes for the main road, with drivers making right turns to get on and off of these streets. However, it may also be worth evaluating making the streets one way in the other direction, which would not serve through traffic as well, but might improve the use of these streets for access to businesses in the area.