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Description:

Walailak University continually uses the principle of integrated waste management under the green university policy with the goal of zero waste management, regard to economic social, and environment for sustainability according to Sustainable Development Goals (SDGs). Walailak University has a program that name is the development project of wastewater, hazardous waste and solid waste management system (WMWU) (Pic. 3.1-1) which is a responsibility unit to extensive manage all the waste in the university, except specific waste from laboratories that should not be included in the normal bin due to their high concentrations of toxic chemicals, heavy metals and infectious sample. The laboratory waste was especially collected and stored by the Center of Scientific



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and Technological Equipment of Walailak University (CSE) and was disposed of by The Recycle Engineering Co., Ltd which a professional external company that the university was directly contacted for co-operation. This system is admired in Thailand more than self-recycling because of the economic-social dimension. Walailak University uses four differential color bins for separating the waste in general as;

- The green one for biodegradable waste (surely organic biodegradable waste)
- The yellow one for recyclable waste (this bin allows all types recyclables for example plastic, paper, glass, aluminum etc. to be placed in the same container, making it easier for the user)
- The dark blue one for solid waste (for non-recyclable waste)
- The red one for community infectious waste, it stands only in the toilet area, which is a separate hazardous waste bin from other types of waste bins.

The differential waste was collected and transported to waste management site for proof again by the WMWU project then it was managed follow as;

- All of biodegradable waste including food waste and garden waste were send to make up a composting (Pic. 3.1-2), the fertilizer produced is used for gardens and trees on itself university. This recycling program helps to save money on fertilizer purchases by outside, which is the reuse of resources into products that can be utilized.
- The WMWU uses co-operation between an external franchise recycling company, Wongpanit company, to manage all of a recyclable waste. it was classified into iron, kinds of plastic, glass bottle, Kraft board, aluminum can, unused able paper, zinc and etc (Pic. 3.1-3) by the recycling program (The recycle waste bank project). Finally, it can sell and create a value return to economic of university.
- The solid waste, non-biodegradable and non-recyclable waste, which was a combustibleness. Last year, Walailak University by the Green University Project organized an Eco block workshop activity by inviting experts to share their knowledge on how to recycle waste that is not worth recycling, such as refill bags/single-use plastic bags/snacks plastic bags, etc. (Pic. 3.1-4). It can be used as an ingredient in making bricks and blocks for use in decorating the garden, adding a walkway in the campus.
- The WMWU use the combustible residue waste as fuel for incinerators that produce electricity (Pic. 3.1-5). The infectious waste was dispersal by self-sanitary incinerator according to the stipulation of the public health ministry of Thailand.



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- The WMWU make up a mercury separating machine for recycling a mercury out of the e-waste then the other toxic waste was recycled by solidification to construction materials for reclamation of walkways.

Additionally, Walailak University have program to promote awareness of students with learning course (GEN64-142: Environmental Conservation and Global Warming) that all student must to register and train in topic of waste separating rightfully as well as ours staff must to be encouraged by Walailak University Go Green kick off activity and Green University Project continually in every year. Consistent with the SDG, Goal 3: ensure good health lives and promote well-being for all at all ages, Goal 12: ensure sustainable consumption and production patterns, Goal 14: conserve and sustainably use oceans, sea and marine resources for sustainable development, Goal 15: protect, restore and promote sustainable use of terrestrial ecosystems, and Goal 17: strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development.

Additional evidence link:

1. URL show that the Facebook website link of The development project of wastewater hazardous waste and general waste management system (WMWU): <https://www.facebook.com/WMWUTH/>
2. Website of The Center of Scientific and Technological Equipments of Walailak University (CSE): <https://cse.wu.ac.th/>
3. Website of The Recycle Engineering Co.,Ltd.: <http://www.recycleengineering.com/>
4. Website of Wongpanit company : <http://www.wongpanit.com/>
5. Website of Green Walailak University : <https://green.wu.ac.th/>

References

- [1] J. Lienig, H. Bruemmer (2017). "Recycling Requirements and Design for Environmental Compliance". Fundamentals of Electronic Systems Design. Springer. pp. 193–218.
- [2] Geissdoerfer, Martin; Savaget, Paulo; Bocken, Nancy M.P.; Hultink, Erik Jan (2017). "The Circular Economy – A new sustainability paradigm?". Journal of Cleaner Production. 143: 757–768.

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ธนาคารเขียว
โครงการพัฒนาระบบบริหารจัดการน้ำเสีย
ขยะอันตราย และขยะทั่วไป มหาวิทยาลัยวลัยลักษณ์

จัดตั้งธนาคารขยะรีไซเคิล
ซึ่งต้องขยะที่เก็บทั่วไป เช่น ขวดพลาสติก กระดาษ โลหะ กระเบื้อง ผ้าฝ้าย เป็นต้น
เริ่มบริการตั้งแต่วันที่ 1 พฤษภาคม 2562 ณ บ่อขังน้ำเสีย

ติดต่อขอรายละเอียดได้ที่ <https://www.facebook.com/wu.wastebank> หรือโทรสอบถาม โทร. 054-5078524
เบอร์โทร: 054-5078524 (วิทยุภายใน) 054-5078524 (ศูนย์บริการ)

โครงการจัดการขยะธนาคารขยะรีไซเคิล
เพื่อลดปริมาณขยะที่ส่งไปฝังกลบและลดผลกระทบต่อสิ่งแวดล้อม
* เริ่มบริการตั้งแต่วันที่ 1 พฤษภาคม 2562 ณ บ่อขังน้ำเสีย

3 GOOD HEALTH AND WELL-BEING
12 RESPONSIBLE CONSUMPTION AND PRODUCTION
14 LIFE BELOW WATER
15 LIFE ON LAND
17 PARTNERSHIPS FOR THE GOALS

SUSTAINABLE DEVELOPMENT GOALS

The recycle waste bank project and recycle price list for exchange.

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The collage features several photographs: students participating in a recycling activity with the slogan "Reduce. Reuse. Recycle."; students working on an eco-block workshop; a group of students sitting on a stage; and a group of students holding certificates. A large green box contains a recycling symbol and the text "Thank You". At the bottom, there are icons for Sustainable Development Goals 9, 12, 14, 15, and 17, along with the "SUSTAINABLE DEVELOPMENT GOALS" logo.

Eco-block workshop activities; bring disposable plastic bags to make a block on the walkway

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SUSTAINABLE DEVELOPMENT GOALS

:The incinerator with power generator, Walailak University.

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The mercury separating machine

The construction materials for reclamation of walkways.



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SUSTAINABLE DEVELOPMENT GOALS

Walailak University.

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12.3.1 Waste tracking
Year: 2019
Program to Reduce the Use of Paper and Plastic on Campus






3.2 Program to Reduce the use of paper and plastic on campus

Paper


Separate 2 pages of used paper and the back page (Reuse paper).
Change the use of paper to electronic systems.









Plastic











- Say No single use Plastic
- Zero Plastic and Foam Boxes
- Bring your own cup get 5% discount
- Campaign "SAVE THE EARTH"
- Campaign "Mob-Rak" SHARE


(Donate used paper & cloth bags to the Foundation)




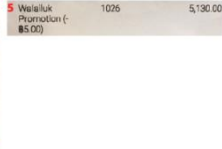












Program to Reduce the Use of Paper and Plastic on Campus

Description:

1) Program to Reduce the Use of Paper:

- Walailak University donates used paper and donates cloth bags under (1) **the campaign "Mob-Rak" of the Property Management Center**. Donations Page 2 paper in "Paper Page 3 to invisible friends" Foundation of the Blind in Thailand Under Royal Patronage. Donate 1 page of the document in the project "Resurrection Paper of the Volunteerism Foundation of Thailand under Royal Patronage. And donate cloth bags under the project "Carry cloth bags to put medicine, refrain from using plastic bags" of Walailak University Medical Center Hospital (Pic.3.2-3).
- Walailak University has set the policy and IT to support paperless system such as (2) **Project to reduce the use of paper for staff at work**; WU DOMS Digital Office, WU E-Booking, WU E-Car, WU FINANCIAL, WU Asset Management, E-service, E-Personnel Management Information System, WU E-report, WU E-Service DPS, WU E-

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Meeting, WU E-Jpas, WU E-Service Buildings and Utilities, E-form, and E-signature in daily workplace. (3) **Project to reduce the use of paper for students;** WU Library Catalog (OPAC) and WU E-learning, started in year 2017 until now (in year 2022) (Pic.3.2-2). WU changed from E-office to WU-DOMS (Walailak University Digital Office Management System) as well as E-learning (Moodle) and E-testing and online learning by using ZOOM and MS-teams for online course learning especially COVID-19 situation. We can reduce 73% of paper waste in university.

• After we have helped each other to implement the program to Reduce the Use of Paper on Campus, we have been able to reduce the use of paper every year from 2016-2022 as shown in this table

Type of paper	Paper used (reams of paper)						
	2016	2017	2018	2019	2020	2021	2022
80 gram A4	6,892	6,117	5,090	1,855	1,214	1,683	1,956
70 gram A4	7,729	5,959	3,920	2,642	638	1,819	1,713
Total	14,621	12,076	9,010	2,493	1,852	3,502	3,669

Remarks; 500 paper/reams

□ Walailak University has set the policy and IT to support paperless system such as (4) **Project to reduce the use of paper for staff at work;** WU DOMS Digital Office, WU E-Booking, WU E-Car, WU FINANCIAL, WU Asset Management, E-service, E-Personnel Management Information System, WU E-report, WU E-Service DPS, WU E-Meeting, WU E-Jpas, WU E-Service Buildings and Utilities, E-form, and E-signature in daily workplace. (5) **Project to reduce the use of paper for students;** WU Library Catalog (OPAC) and WU E-learning, started in year 2017 until now (in year 2022) (Pic.3.2-1).



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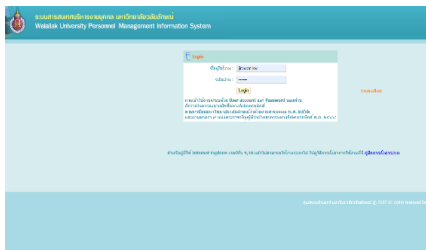


WU DOMS Digital Office



WU E Car

Project to reduce the use of paper for staff and student at work

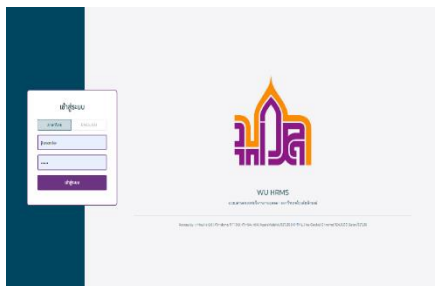


E Personnel Management information system

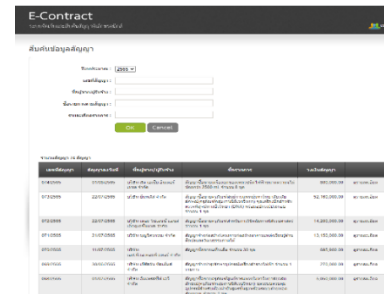


WU E Jpas

Project to reduce the use of paper for staff and student at work (continue)



WU HRMS



WU E-contract

Project to reduce the use of paper for staff and student at work (continue)



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● As we have been able to reduce the use of paper and plastic in this section, we would also like to point out the connection with the recycling program in Section 3.1. From the picture of the reduction in the amount of paper used starting from the year of data collection to the present, it is found that universities turn to digital office management systems in their document processing. This makes it possible to save a paper budget of nine hundred thousand baht, save five million sheets of paper, and save two million baht in copying costs. Finally, the university was awarded the best organizational leadership award in the category of Outstanding Strategies at the "Thailand Digital Transformation Award 2021" on 26 October 2021 (Pic.3.2-2).



Walailak University IT supports paperless system to reduce paper in daily workplace.

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Walailak University IT supports paperless system to reduce paper in daily workplace.

2) Program to Reduce the Use of Plastic on Campus:

- Walailak University is now able to reduce the use of paper and plastic by the following 3R (Reduce, Reuse, Recycle) methods such as; bring your own shopping bag, stop buying bottled water, bring your own thermos to the coffee shop, choose cardboard over plastic bottles and bags, say no to straws and so many of these suggestions are to reduce your waste, which will, in turn, reduce your use of plastic trash bags. Walailak University launch the campaign to reduce plastic waste for example, (6) the campaign “Say no to plastic bag” ask the student and staff refuse plastic bag during shopping in the University’s market. All student and staff have to bring their own reusable bag for shopping (Pic.3.2-4). There are 10 foods and drink shop participate in the campaign. These two campaign can reduce plastic waste in the campus e.g. 7-11 shop can reduce using of plastic bag 10,374 bag in 2018, 154,390 in 2019, 278,240 in 2020, 350,730 in 2021, and 421,120 in 2022.

- (7) The recycle waste bank project of WMWU uses co-operation between an external franchise recycling company, Wongpanit company, to manage all of a recyclable waste. it was classified into iron, kinds of plastic, glass bottle, Kraft board, aluminum can, unusable paper, zinc and etc (Pic. 3.1-3) by the recycling program (The recycle waste bank project). Finally, it can sell and create a value return to economic of university.

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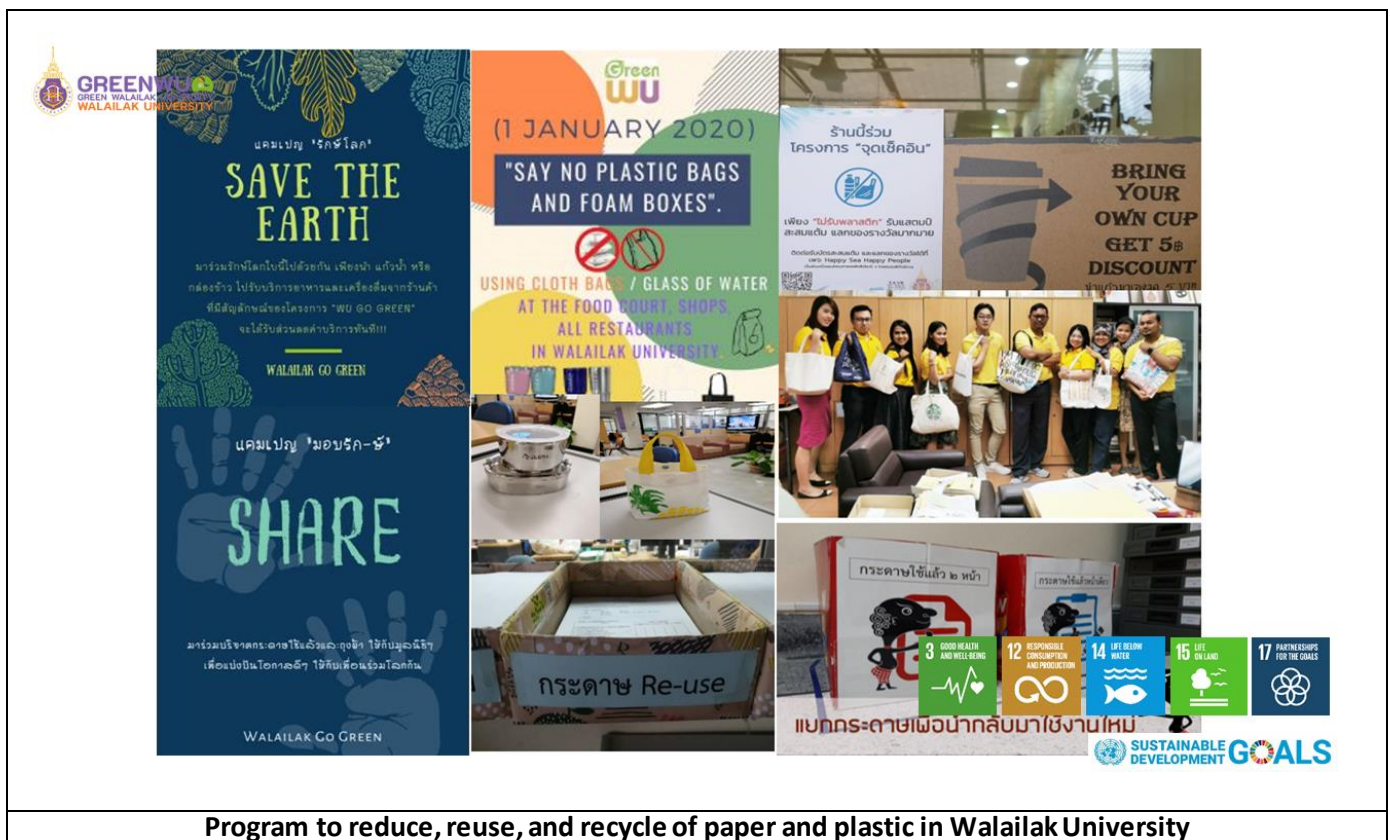
- Walailak University by Green University Project has **(8)** organized an **Eco-Block Workshop** to use both single-use plastic bags and plastic waste that are not worth recycling into ingredients to make blocks for use in landscaping. Make a walkway in the garden or a walkway between the buildings within the university (Pic.3.1-4).

Additional evidence link: Website of Walailak University: <https://www.wu.ac.th>

Paper usage information from the parcel section (In the form of withdrawal) as a separate unit.

THAILAND DIGITAL TRANSFORMATION AWARDS 2021 type STRATEGIES <https://www.wu.ac.th/th/news/20470>

Practical training activities ECO-BLOCK : <https://www.wu.ac.th/th/news/20213>



Program to reduce, reuse, and recycle of paper and plastic in Walailak University



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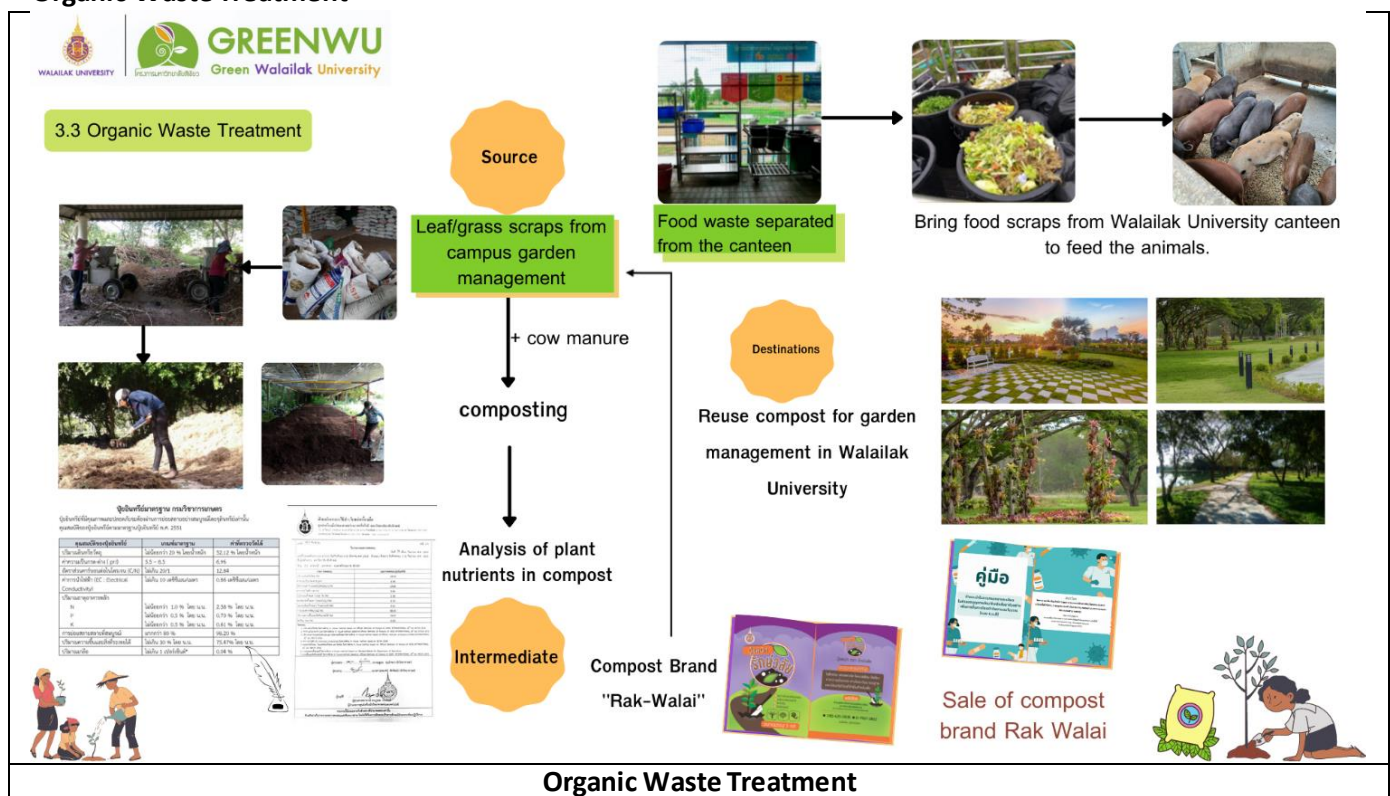
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Organic Waste Treatment



Description:

The organic wastes in the University, green waste and food waste, which were managed as follows;

1. Green waste (Picture 3.3-1) was collected from all garden area in Walailak University. They are shredded into small pieces by the shredding machine and composted by aerated pile. Raw materials for the composting included the green waste, cow manure, and effective microorganism (EM). The compost time was 6 months. In 2021, the compost was produced 1.2 tons, and 2022 was 1.5 tons. The compost was used for soil conditioning in the garden of Walailak University.

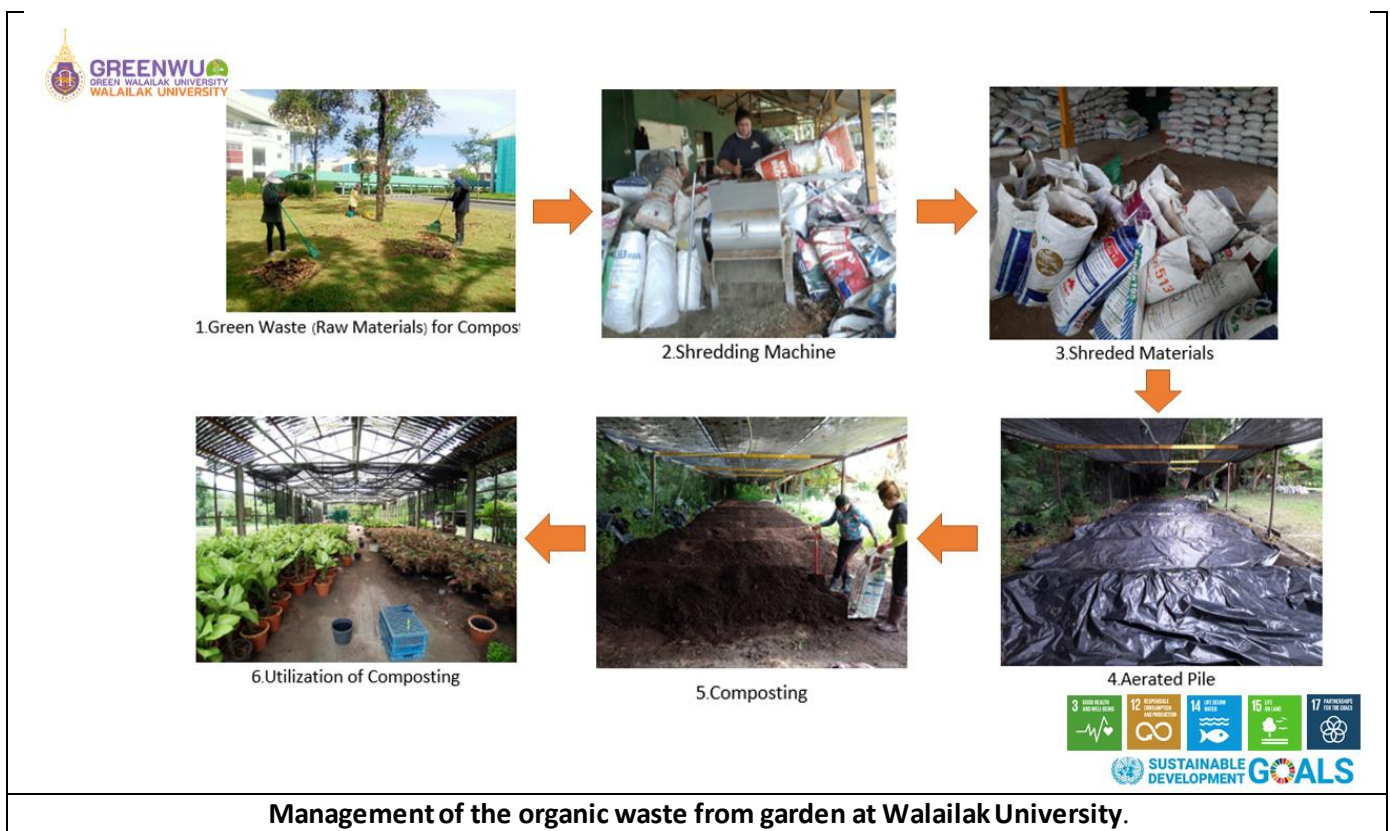
2. Food waste from cafeteria in Walailak University (Picture 3.3-2) were collected by food shop owner. In addition, food waste from all building was separated at source (green bin). All food waste produced in Walailak University was recycled by feeding animal in farm at Walailak University.

Additional evidence link:

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Management of the organic waste from garden at Walailak University.



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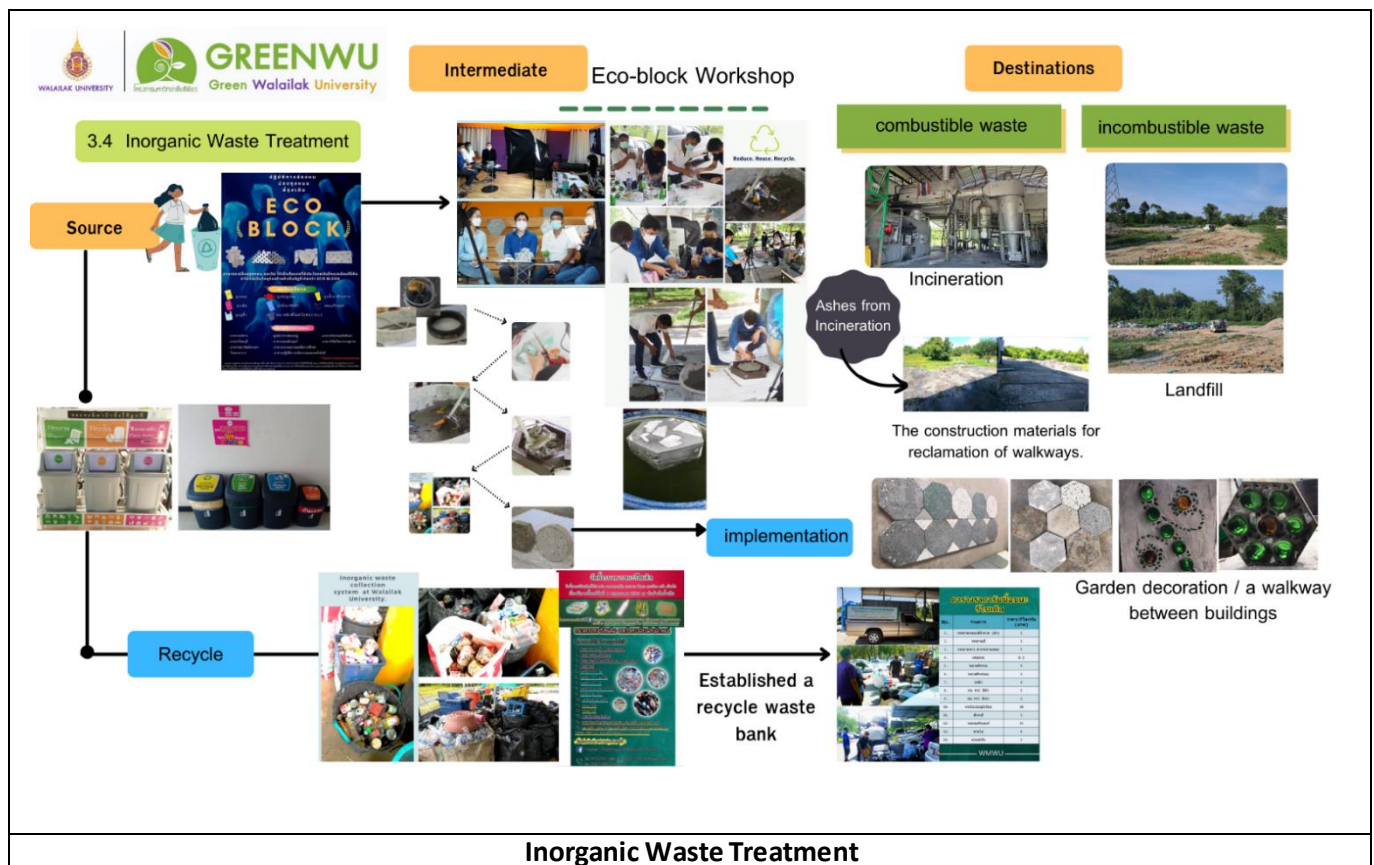


Management of the food waste from the canteens at Walailak University.



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Inorganic Waste Treatment





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Description:

The sources of inorganic waste in the university include canteens, dormitories for students and faculty members, and offices. Management of inorganic waste at Walailak University. The process of inorganic waste management begins with source separation, the yellow bin for recycle waste and the blue one for solid waste. The waste was collected at the solid waste storage and transported by the pick up to the waste separation building in the University. Recycle waste i.e. papers, glass bottles, plastic bottles, aluminums cans, and metals were manual separated at the separation building. This separation was performed to make sure that all recycle waste was separated from solid waste Pic.3.4-1.

The year 2021 is the time of the COVID-19 crisis. As a result, the university has to provide 100% online teaching and learning. The amount of waste in the university during this period is reduced. Typically, the amount of waste is 0.52 kg/person/day. But during the time when the students did not come to the university, they only thought of the waste generated by the staff, which is the total waste is 5,774.90 kg/week. All waste was separated into 215.00 kg/week of recycled waste, 1,975.70 kg/week of combustible waste, and 3,584.20 kg/week of incombustible waste.

In 2022, the situation began to return to normal. Students returned to study at 100% on-site universities found that the total amount of waste generated was 0.52 kg/person/day. The total waste generated on campus is 50,133.72 kg/week. All waste was separated into 1,864.97 kg/week of recycled waste, 17150.75 kg/week of combustible waste, and 31,118.00 kg/week of incombustible waste as shown in Pic.3.4-2.

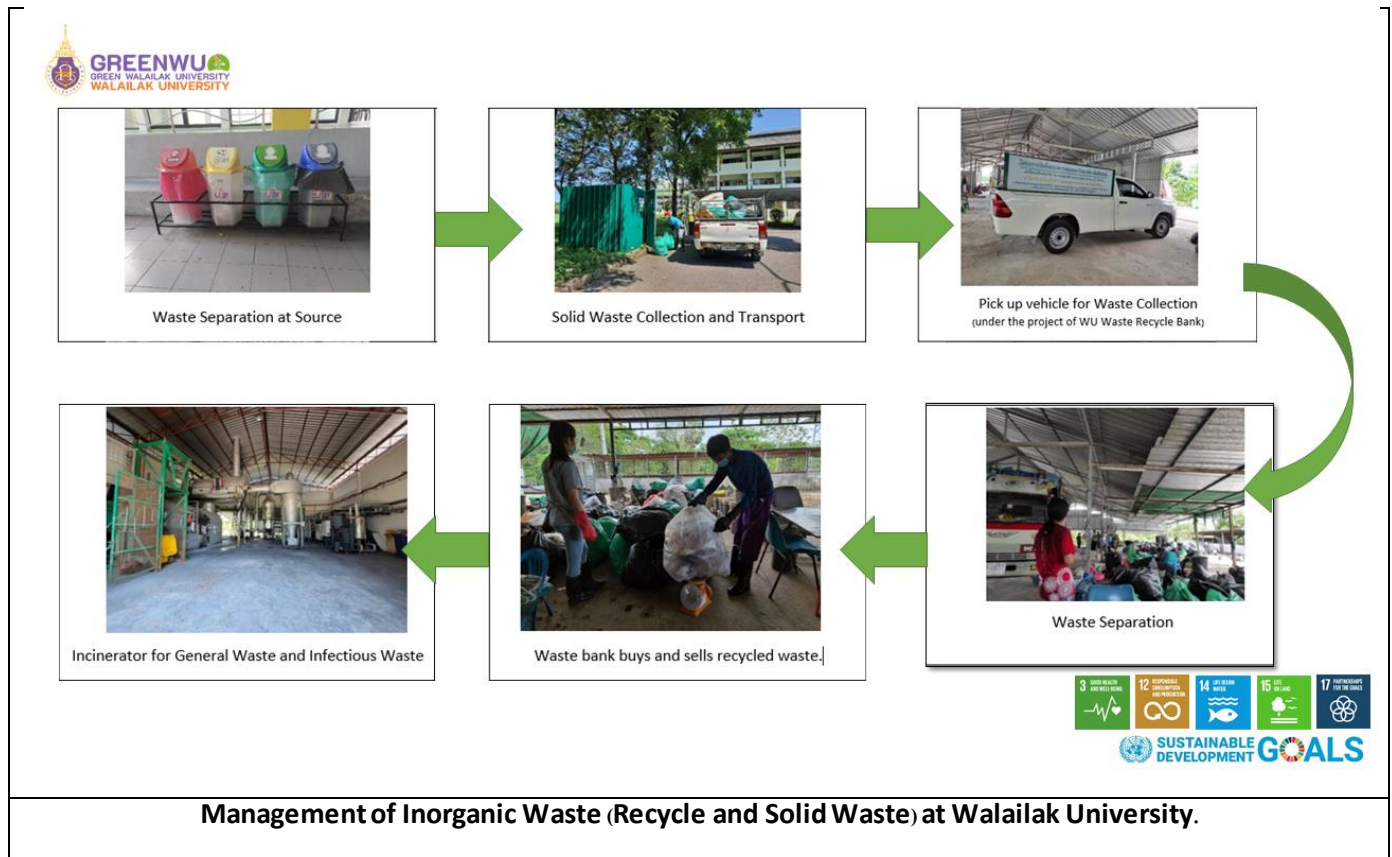
Inorganic waste that cannot be recycled, such as plastic bags that are not worth recycling or single-use plastics. The Green University Project has been used as a mixture of brick blocks to be used as a walkway in the garden and as a walkway between buildings within the university.

Additional evidence link: <https://www.facebook.com/WMWUTH>

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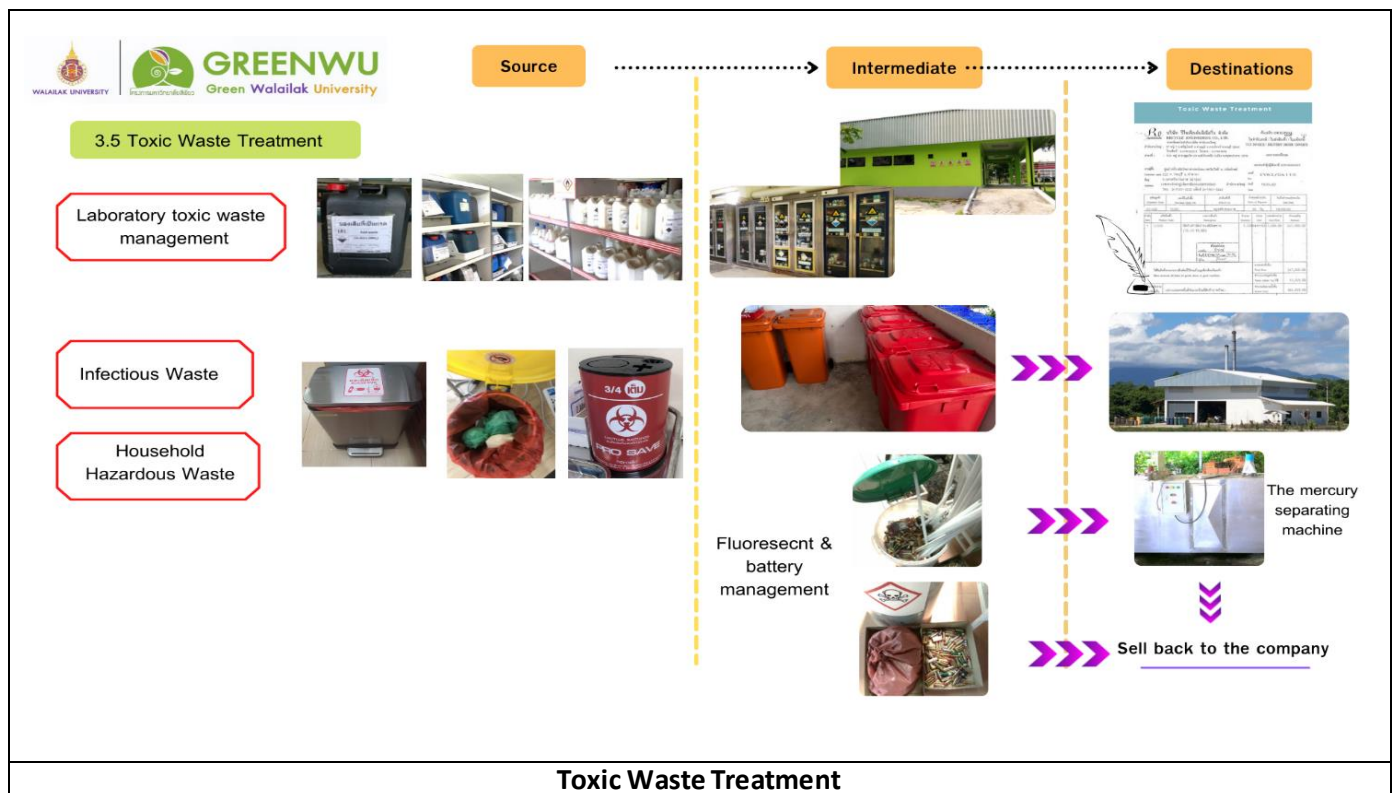


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การนำขยะกลับมาใช้ประโยชน์	890.35 ตัน:ปี
การฝังกลบ	752.15 ตัน:ปี

The total amount of waste generated within Walailak University in 2019.

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Year: 2019
Toxic Waste Treatment





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12.3.1 Waste tracking

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Description:

1. Infectious waste from Walailak University Medical Center Hospital and establishments around the university has taken infectious waste and hazardous waste to be disposed of at the university's hazardous waste incinerator (Pic.3.5-1).

2. Toxic wastes from the laboratories were collected in glass or plastic containers. Walailak University has a temporary toxic waste storage to safely store the toxic waste received from the all laboratories (Pic.3.5-2). The wastes are stored separately according to their types, such as acid liquid, oil liquid, flammable liquid and toxic solid waste. The total toxic wastes from laboratory are divided into 2 types; liquid and solid toxic wastes. When the collection time is due, the toxic wastes were sent to the authorized company.

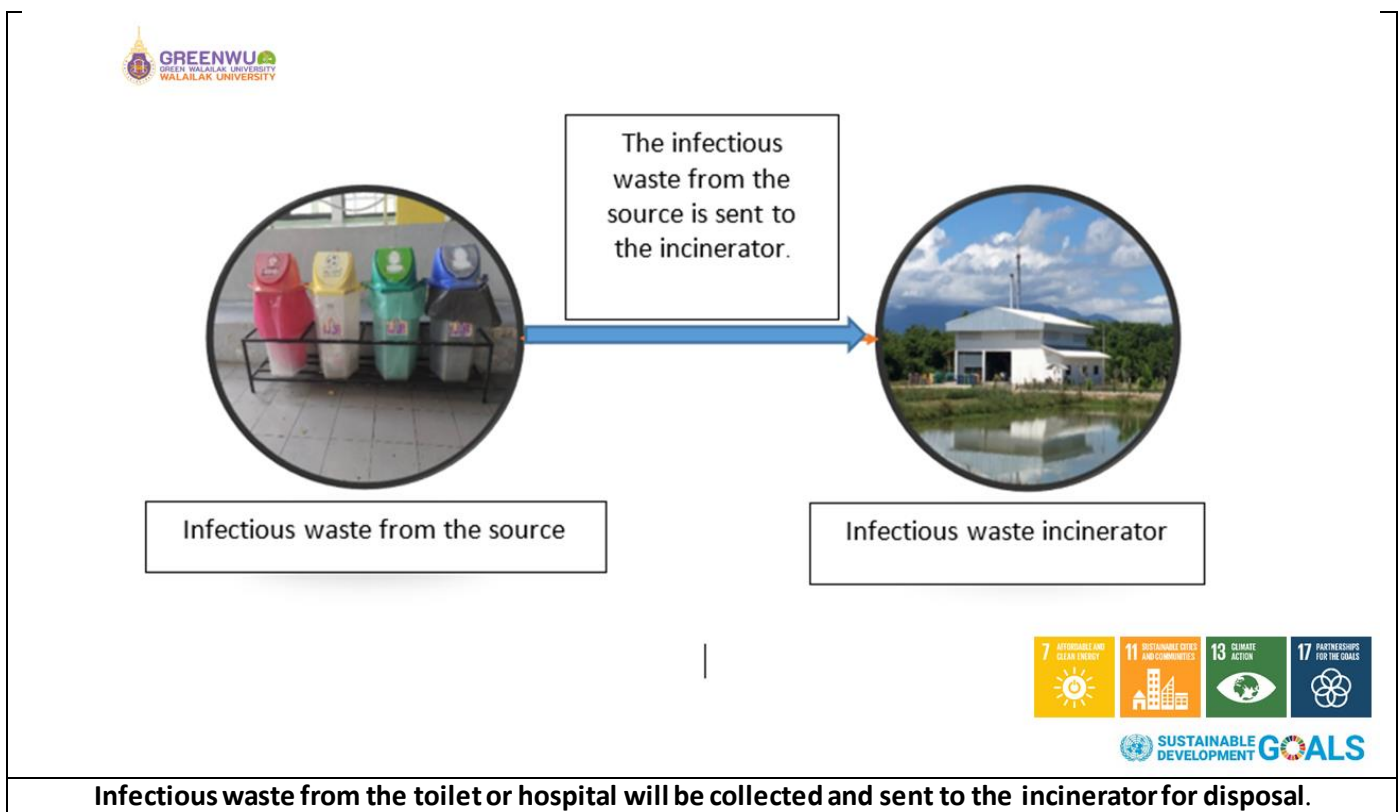
3. Fluorescents wastes (Pic.3.5-3) were separated at the sources from specific containers. The fluorescents were disposed by a machine at the sorting plant in the disposal area of Walailak University.

Additional evidence link:

1. Website of The Center of Scientific and Technological Equipments of Walailak University (CSE): <https://cse.wu.ac.th/>
2. Website of The Recycle Engineering Co.,Ltd.: <http://www.recycleengineering.com/>

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GREENWU
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บริษัท ไซวอลด์ เวสต์ แมเนจเม้นท์ จำกัด
PROJECT WASTE MANAGEMENT CO., LTD.
เลขที่หนังสือแจ้งที่ 21982566

กรมส่งเสริมการค้าระหว่างประเทศ

บริษัท ไซวอลด์ เวสต์ แมเนจเม้นท์ จำกัด
PROJECT WASTE MANAGEMENT CO., LTD.
เลขที่หนังสือแจ้งที่ 21982566

กรมส่งเสริมการค้าระหว่างประเทศ

เอกสารแนบ

วันที่	สถานที่	ประเภทของของเสีย	ปริมาณ	ดำเนินการแล้ว
1	โรงงาน	หลอดไฟ	1000	1000

เอกสารแนบ

เอกสารแนบ

เอกสารแนบ

เอกสารแนบ



Documents to send light bulbs to the company to destroy

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Country : Thailand
Web Address : <https://green.wu.ac.th/>

12.3.1 Waste tracking

Year: 2019
Sewage Disposal



Description:

The sewage water, the water usage patterns of students and staff of Walailak University are both grey water, namely wastewater from washing either from bathing, dishes or laundry and black water as wastewater from toilets due to Walailak University is a comprehensive university. Walailak University has a method to dispose sewage water with regard to environment and well-being of community. In the part of black water, The University use underground septic tank set (Pic. 3.6-1) to deposal when it is full capacity the sludge was ferment to bio-composting. For the gray water to be collected by the combined pipe system into the central wastewater treatment of university (Pic. 3.6-2). The central wastewater treatment plant uses aerated lagoon, followed by the pond stabilization. The treated wastewater characteristic (Pic. 3.6-3) is better than the wastewater standard which determinate by the Pollution Control Department, Thailand. The treated water was utilized for watering a tree in the university area (Pic. 3.6-4).

Additional evidence link:

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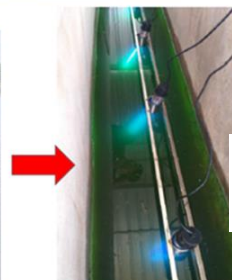
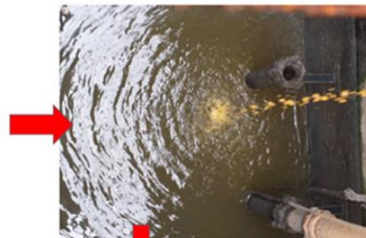
The underground septic tank was set when under construction



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Year: 2019



1. Installing a UV Light Water Filtration System
2. Installing a generator system at the sluice gate



The central wastewater treatment of Walailak University

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Country : Thailand
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12.3.1 Waste tracking

Year: 2019



การตรวจสอบประสิทธิภาพระบบบำบัดน้ำเสียในเบื้องต้น

ตรวจสอบว่า เครื่องมือวัดที่ใช้ในการวัดค่าทางเคมีและชีวเคมีในห้องปฏิบัติการมีความถูกต้องหรือไม่ และตรวจสอบว่า เครื่องมือวัดที่ใช้ในการวัดค่าทางเคมีและชีวเคมีในห้องปฏิบัติการมีความถูกต้องหรือไม่

การตรวจสอบประสิทธิภาพระบบบำบัดน้ำเสียในเบื้องต้น

ตรวจสอบว่า เครื่องมือวัดที่ใช้ในการวัดค่าทางเคมีและชีวเคมีในห้องปฏิบัติการมีความถูกต้องหรือไม่ และตรวจสอบว่า เครื่องมือวัดที่ใช้ในการวัดค่าทางเคมีและชีวเคมีในห้องปฏิบัติการมีความถูกต้องหรือไม่

การตรวจสอบประสิทธิภาพระบบบำบัดน้ำเสียในเบื้องต้น

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รายงานผลการตรวจสอบประสิทธิภาพระบบบำบัดน้ำเสีย

วันที่: 11 สิงหาคม 2562

พารามิเตอร์	ค่าที่วัดได้	ค่ามาตรฐาน
อุณหภูมิ	28.5 °C	15-25 °C
ค่าความเป็นกรด-ด่าง (pH)	7.5	6.5-8.5
ค่าออกซิเจนละลายน้ำ (DO)	4.5 mg/L	> 2.0 mg/L
ค่าความขุ่น (TSS)	10 mg/L	< 50 mg/L
ค่าความเค็ม (TDS)	100 mg/L	< 500 mg/L
ค่าความเข้มข้นของสารอินทรีย์ (COD)	120 mg/L	< 500 mg/L
ค่าความเข้มข้นของสารอินทรีย์ (BOD)	10 mg/L	< 50 mg/L
ค่าความเข้มข้นของไนโตรเจน (NH ₄ -N)	0.5 mg/L	< 1.0 mg/L
ค่าความเข้มข้นของไนโตรเจน (NO ₃ -N)	1.0 mg/L	< 5.0 mg/L
ค่าความเข้มข้นของไนโตรเจน (TN)	1.5 mg/L	< 5.0 mg/L

รายงานผลการตรวจสอบประสิทธิภาพระบบบำบัดน้ำเสีย

วันที่: 11 สิงหาคม 2562

พารามิเตอร์	ค่าที่วัดได้	ค่ามาตรฐาน
ค่าความเป็นกรด-ด่าง (pH)	7.5	6.5-8.5
ค่าออกซิเจนละลายน้ำ (DO)	4.5 mg/L	> 2.0 mg/L
ค่าความขุ่น (TSS)	10 mg/L	< 50 mg/L
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ค่าความเข้มข้นของไนโตรเจน (TN)	1.5 mg/L	< 5.0 mg/L

รายงานผลการตรวจสอบประสิทธิภาพระบบบำบัดน้ำเสีย

วันที่: 11 สิงหาคม 2562

พารามิเตอร์	ค่าที่วัดได้	ค่ามาตรฐาน
ค่าความเป็นกรด-ด่าง (pH)	7.5	6.5-8.5
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ค่าความเข้มข้นของไนโตรเจน (NO ₃ -N)	1.0 mg/L	< 5.0 mg/L
ค่าความเข้มข้นของไนโตรเจน (TN)	1.5 mg/L	< 5.0 mg/L



The result of treated wastewater parameters



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12.3.1 Waste tracking

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